The University of Alberta
Printing Department
Edmonton, Alberta

Digitized by the Internet Archive
in 2017 with funding from
University of Alberta Libraries

https://archive.org/details/rudolfi1975

THE UNIVERSITY OF ALBERTA

RELEASE FORM

NAME OF AUTHOR.....Peter.Gino.Rudolfi.....

TITLE OF THESIS .Pedagogic.Principles.in.Annotations.....

..of.Popper's.Etudes,.Opus.73.....

DEGREE FOR WHICH ESSAY WAS PRESENTED .Master.of.Music.....

YEAR THIS DEGREE GRANTED ..1975.....

Permission is hereby granted to THE UNIVERSITY OF ALBERTA LIBRARY to reproduce single copies of this essay and to lend or sell such copies for private, scholarly or scientific research purposes only.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

Peter Gino Rudolfi

PERMANENT ADDRESS:

8329 Anthony Circle

Los Angeles, 90046

California

DATED May 31 1975

THE UNIVERSITY OF ALBERTA

Pedagogic Principles in Annotations of Popper's Etudes, Opus 73

by

PETER GINO RUDOLFI

AN ESSAY

SUBMITTED TO THE DEPARTMENT OF MUSIC

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF MASTER OF MUSIC

IN APPLIED MUSIC

THE DEPARTMENT OF MUSIC

EDMONTON, ALBERTA

FALL, 1975

DEPARTMENT OF MUSIC
UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA

750274

THE UNIVERSITY OF ALBERTA

DEPARTMENT OF MUSIC

The undersigned certify that they have read, and recommend to the Department of Music for acceptance, an essay entitled Pedagogic Principles in Annotations of Popper's Etudes, Opus 73, submitted by Peter Gino Rudolfi in partial fulfillment of the requirements for the degree Master of Music in Applied Music.

Brian L. Harris
Co-Supervisor

Claude Kenneson
Co-Supervisor

Michael Bews

Robert B. Ware

Date May 31/75

ABSTRACT

The purpose of this essay is to explore new concepts of cello pedagogy through the formulation of annotations to David Popper's Highschool of Cello Playing, Opus 73.

The first chapter is a general discussion of the emergence of the violoncello as a solo instrument. Its precursor instrumental types, the development of the bow, major pedagogic treatises, and national schools of playing are briefly explored historically.

Chapter Two deals with the theoretical concepts of pedagogy as applied to the performance process. Distinctions are made between cortical and subcortical control and between the physical and psychological apparatus. Characteristic actions in the right-hand and left-hand gestures are defined and certain "devices" for their monitoring are elucidated. Central to the theme of the essay is the idea that the "ideokinetic" process of "musical image-making" creates a system where there is physical movement but no computation nor awareness of transmitted effort.

Chapter Three discusses the value of musical études for the cello student, and organizes the études of David Popper into technical categories. Selected études are then annotated incorporating the practical application of those principles of pedagogy defined in Chapter Two.

TABLE OF CONTENTS

CHAPTER I — THE EMERGENCE OF THE VIOLONCELLO AS A SOLO INSTRUMENT 1

Precursors to the Cello: Gamba; Rebec; Lyra da Braccio 1
The Development of the Bow 6
Major Pedagogic Treatises 9
National Schools of Playing 11

CHAPTER II — THE PEDAGOGICS OF CELLO PERFORMANCE 21

The Cortical Control of the Physical Apparatus .. 21
The Psychological Apparatus and its Subcortical Controls 26
The Relationship of the Cello to the Player 33
The Suspension of the Arms 35
Right-Hand Gesture 37
Incorporation of the Bow into the Right-Hand Gesture 39
Additional "Devices" for the Right-Hand Gesture:
(a) The Bowing Arc 42
(b) Verbal Pulsing 43
The Left-Hand Gesture 47
Two "Devices" in the Left-Hand Gesture:
(a) The Left Thumb 51
(b) Naming the Note: Musical Image-Making ... 55

CHAPTER III — THE PEDAGOGICAL APPLICATION OF POPPER'S ETUDES, OPUS 73 62

The Efficacy of Etudes for the Cello Student 62
The Intervallic Structure in Cello Music and the Technical Categories of Popper's Opus 73 69
Pedagogic Annotations of Selected Etudes 73
(a) Type I: Orchestral 74
(b) Type II: String Crossing 79
(c) Type III: Shifting 82
(d) Type IV: Double Stops 93
(e) Type V: Thumb Position 107
(f) Type V and VI: Double Stops and Thumb Position 109

GLOSSARY 115

APPENDIX 117

BIBLIOGRAPHY 124

THE DEPARTMENT OF MUSIC
of
THE UNIVERSITY OF ALBERTA

presents

PETER RUDOLFI, cello

assisted by

MICHAEL MASSEY, piano

Friday, May 30, 1975 at 8:00 p.m.
Convocation Hall, Arts Building

SONATA IN A-MINOR, OPUS 36 (1883) ..... Edvard Grieg

Allegro agitato
Andante molto tranquillo
Allegro

SONATA, OPUS 4 (1909-1910) ..... Zoltán Kodály

I Fantasia
II Allegro con spirito

INTERMISSION

SONATA IN F-MAJOR, OPUS 99 (1886) ..... Johannes Brahms

Allegro vivace
Adagio affettuoso
Allegro passionato
Allegro molto

This recital is presented in partial fulfillment of the requirements for the Master degree for Mr. Rudolfi.

CHAPTER I

THE EMERGENCE OF THE VIOLONCELLO AS A SOLO INSTRUMENT

Precursors to the Cello: Gamba; Rebec; Lyra da Braccio

In order to evaluate the études of David Popper, it is necessary to become acquainted, if only in a general outline, with the history of the instrument for which they are written. The emergence of the cello as a solo instrument is relevant to the pedagogical theme of this essay because the playing technique and the musical aesthetic of the literature for cello are products of historical influences. The Popper études, in addition to lending themselves to the particular pedagogic approach as set forth in this essay, also represent a definite stage of musical aesthetic as is evidenced by their technical demands; the études are idiomatic and represent compositional attempts to realize the inherent dynamic and tonal resources of the violoncello. This brief chapter outlines the areas of the cello's physical features in relation to precursor types of bowed instruments; it also surveys pedagogical landmarks for the violoncello and national schools of playing.

Cellists of the twentieth century share with all performers today a cognizance regarding the degree to which their instrument has provided inspiration to the outstanding composers of the past and the present. Students of the cello become acutely aware of the shadow cast over their instrument by the violin, which in the past commanded the attention of a far greater number of composers. Violinists in their turn experience a similar relative "neglect" in comparison to the wealth of literature for members of the keyboard family, an instrumental class which stands second only to the voice in terms of the amount of music

created for it. Music for the cello was first composed in the Baroque era. Because idiomatic music was the product of the Baroque era, it is here that the sketch of a transition in both musical attitudes and of the mechanical means for their realization must take place. Instruments in the Renaissance era were relegated to the role of accompaniment, requiring a correspondingly less complex performance technique than the voice. There are many features of contrast between the Baroque and preceding Renaissance eras. Those Baroque features most pertinent to our discussion are the emphasis upon secular music; the intimacy of the private drawing room yielding to the public concert hall as a place of musical performance (a process requiring a more resonant and dynamic instrument like the cello); the transition from modal to tonal musical systems requiring an unfretted instrument which could be played in tune with the pitches of keyboard instruments and thus blend with all the vagaries of "tempered tuning" (itself an evolving system); and the transition of function from subservience to the voice to independent and soloistic instrumental composition for which instrumental technique required idiomatic cultivation.

The instrumental techniques which had been developed to accompany singing and dancing began to require a pedagogy to deal with the increasingly frequent instrumental transcriptions from vocal and dance forms.[1]

---

[1] "...instrumental music was at first a substitute for vocal music...it grew in importance during the fifteenth and sixteenth centuries ...it finally emerged as a separate branch of music in the seventeenth [century]...it came into the light of day about 1600 without a true style of its own. Instrumental melodies remained within the easy range of the human voice, contained no intervals that the voice could not sing easily, and had no awkward or rapidly shifting rhythmic patterns. Above all, the characteristic melodic shapes that today identify a melody as being suitable for violin...were completely missing from early instrumental music." Homer Ulrich, Chamber Music (New York: Columbia University Press, 1966), p.12.

Several families of bowed and plucked chordophones were engaged in a parallel development at the time. These were the lute and guitar and the viola da gamba and violin (viola da braccio) families. Whether or not this so-called "evolution" of instrumental types represented an improvement in the means of musical expression is open to speculation. Many inventions do indeed sacrifice former possibilities. Of importance, however, is the way in which one instrumental form influenced the development of that of another. It will be shown how the influence of the viola da gamba upon the violoncello resulted in an initial hindrance to the realization of the later form's idiomatic potential.

The cello is not the direct descendent of the bass member of the viola da gamba family. The cello was directly preceded by the other members of the violin family--the violin and viola--and then by the lyra da braccio and rebec families.[2] That the violin family could not develop directly from the viol family was made strikingly clear in 1892 in a monograph on the subject by Major Alexander Hajdecki.[3] He shows their specific differences in technical details, their parallel (not successive) development, and the diametrically opposite historical development of the two instrumental types: the natural evolution of viols was from the lower to the higher range, the bass viol as the progenitor; with violins the development was a "building down" from the

---

[2]For a description of the viol, rebec and lyra families and their influence on the cello, see the Appendix, p.113-117.

[3]A. Hajdecki, Die italienische Lira da Braccio. Eine kunsthistorische Studie zur Geschichte der Violine (Mostar: Im Selbstverlag des Autors, 1892).

small size, starting with the alto member.[4]

There can be no doubt as to the role of accompanying instrument by members of the viol family, and it was this heritage which initially obscured the full potential of the cello as a solo instrument.[5] The violoncello was originally considered a "low register" instrument. It inherited those duties of the gamba and keyboard instruments playing the basso continuo line. This required that the cello's full range be restricted to doubling the bass notes of the keyboard player's left-hand part. However, it was this Baroque continuo practice which ultimately, in the polarity of bass and soprano lines, drew attention to the cello timbre, one of far greater sonority than that of the gamba's. This contributed to a recognition of the cello's potential as a solo instrument. The violin was the first member of that family to be fully exploited as an outer voice in a soloistic capacity. As the cello followed in this development, it copied idiomatic features established by and natural only to the violin. Its instrumental potential was thus further retarded through the initial use of playing techniques foreign to the instrument. In essence:

---

[4]For a comparative summary of the details of the viol and violin families, see the Appendix, p. 114-116.

[5]The gamba was primarily used in subordination to the voice. Its application consisted of "(1) as a strengthening instrument for all bass parts vocal or instrumental whether alone or in conjunction with the keyboard instrument; (2) as a solo instrument; (3)perhaps the greatest role, as the instrument for playing the figured general or thorough bass of the early Baroque period. It was the perfect instrument for this subordinate yet very necessary function. The viol tone was smooth, light, clear, soft and it never overshadowed the soloist." See Analee C. Bacon, "The Evolution of the Violoncello as a Solo Instrument" (Ph.D. dissertation, University of Syracuse, 1962), p.71.

> The transcribing of compositions for violin and gamba for the cello hindered the evolution of a beginning technique for the cello because the fingering of a stringed instrument depends upon the plan of half and whole steps in relation to the hand's capacity.[6]

Gamba fingering for the cello required the non-use of certain fingers due to the gamba's tuning in fourths while violinistic fingerings on the cello required unnatural stretches for intervals unobtainable without shifting on the larger fingerboard.

The development of instrumental technique for the cello was further retarded by the fact that its most advantageous proportions were not finally established until after 1710, well after the violin held a place as a solo instrument.[7] It should be born in mind that there existed in the late seventeenth and early eighteenth centuries a virtual subfamily of celli within the violin family. There were in use as many as six celli in different sizes and using different tunings.[8] While Maggini (1580-1630) also made some celli in the proportions finally crystallized into today's standard model, it was not until after 1710 that Stradivari settled upon this model.

In conclusion, a summary of technical advances made possible through the use of the cello rather than the viol includes the following:

---

[6] Ibid., p. 4.

[7] "The violin was already a solo instrument in the late sixteenth century and in 1607 Agazzari [Italian theorist publishing a viol treatise in 1609] writes of the violin as a virtuoso instrument." See Oliver Strunk, Source Readings in Music History (New York: W.W. Norton, 1955), p. 425.

[8] See Appendix, p. 118 for a chart of the various cello sizes.

(1) four strings tuned in fifths (with the eventual addition of metal to the gut material) provided more brilliant sonority and permitted triadic harmony;

(2) eventual longer narrower neck at increased angle to the cello surface--this increased the range of the instrument and permitted the use of strings with greater tension and a wider vibration radius;

(3) the eventual acquisition of an endpin--this released muscular tension providing greater freedom of playing and more resonance of the acoustic body due to contact with the floor;

(4) "overhand" bow hold--this permitted more strongly-accented playing for a more dynamic musical aesthetic; and,

(5) arched bridge--this permitted melodic playing on one string to expedite the cultivation of virtuosity.

The Development of the Bow

Experiments with the violin bow accompanied the newly-designed family of bowed instruments.[9] The potentially soloistic functions for members of the violin family required a bow different than that suitable for gamba playing. The newer ideal was a bow incorporating both lightness and strength to meet the aesthetic demand of a wider range of dynamic accents and loud sustained sounds. Such a bowing technique was conducive to the cello with its technical features of a more arched

---

[9] "In the second half of the seventeenth century, the violin bow was the object of intense experimentation corresponding to the musical ferment of the time." See David Boyden, The History of Violin Playing and Violin Music (London: Oxford University Press, 1965), p. 206.

bridge, thickly-gauged strings, and vibrant acoustical body. Bows built prior to 1740 were of a convex curvature which made it difficult to produce inaudible bow changes and sustained bowing because the slightest pressure exerted by the bow upon the string considerably increased the tension of the bow hairs. Although the bow with a straight stick design was lighter than the other type, it did little to diminish the problem of weight distribution from the arm through the stick into the strings. Both of these bow types were short and were more conducive to détaché and chordal playing. The position of the hand in using the bow was also a factor in a new bow technique. The da braccio instrument position of the violin made it impossible to use the under-hand bow position of the gamba. An over-hand grip was cultivated instead. But while the greater facility for strong accents with the new position was compatible on both the violin and the cello, the differences in the high and low string position on these two instruments necessitated a difference in up-and-down bow strokes for similar results. Considering the early compositional procedure of transcribing gamba and violin music for the cello, one can begin to understand the kind of inimical idiomatic styles infesting early cello literature and retarding the development of cello technique.

It was not until the second half of the eighteenth century that a carefully calculated concave "camber" of bow stick was perfected by François Tourte.[10] Tourte achieved the camber not by cutting the wood into a curve (as others did), but by a laborious process of heating

---

[10]"Tourte played the role of many a genius before and after him: he compounded all the experiments of his immediate predecessors into a bow of perfect design and perfect workmanship that proved to be the ideal and standard for all future bow makers." Ibid., p. 327.

the straight bow stick and bending it to the desired camber. It was this design which ultimately made possible the full realization of the inherent dynamic and tonal resources of the new violin family. Other aspects of Tourte's contribution included:

(1) a standardization of bow sizes;

(2) a reliable bow material in Pernambuco wood (Caesalpina Brasiliensis) permitting a particular taper towards the point;

(3) a balance point farther up towards the point (nineteen to twenty centimeters from the frog) than that of the "typical" "old" bow with its light head; and,

(4) a widened ribbon of hair fastened by a ferrule to make it lie perfectly and uniformly flat while playing.

The instruments themselves were of course built at a much earlier date.[11] The novel feature of the Tourte bow was the fact that the tension of the hairs increased only slightly when the bow has pressed against the strings. Thus, smooth bow changes, powerful legato strokes, and spiccato bowing with a stick that was now balanced and did not collapse all became attainable goals of the new bow technique.

---

[11] Even in the absence of positive evidence that the early makers of members of the violin family, like Giuseppe Guarneri del Gesù, Stradivari, and Maggini did in fact make bows, it is reasonable to infer that they did produce bows which were to some degree compatible with the refinements of the instrument. Boyden remarks: "If bow makers before 1750, who doubtless included Stradivari, remained anonymous, it was not from a sense of false modesty, but simply because they considered the bow an indispensible part of the violin, just as much as the pegs, fingerboard, or tail piece; and the bow was made to fit the instrument in the same manner. There is no reason to think that bows were executed with less care than the instrument itself. The notion that Stradivari would have tolerated a clumsy bow is as preposterous as the idea that he would have tolerated a clumsy violin." Ibid., p. 330.

The variety in the types of bows in use in the seventeenth and eighteenth centuries coincides to some extent with the national differences in the music and playing techniques.[12] In the nineteenth century too, the style of the left-hand emphasis in Popper's études stems historically from the preceding century in which a less facile bow technique was possible with the pronounced outward-curved bow used by eighteenth-century German cellists. This was at a time when both France and Italy were using designs closer to the Tourte model. As a consequence, German cellists favored the cultivation of the left-hand over that of the bow.

Major Pedagogic Treatises

With the focus on stringed instruments in the mid-eighteenth century, string treatises or "tutors" became popular for both the viol and violin families. There is, however, a scarcity of advanced études in any tutors prior to the publication of Geminiani's manual, The Art of Playing on the Violin (1751) in which a sizeable collection is presented for the first time. The early treatises for the cello dealt primarily with establishing principles for left-hand use. The earliest known instruction book for cellists was Salvatore Lanzetti's Principes ou l'Application de violoncelle par tous les tons de la manière la plus facile (1736). This short modest treatise was devoted to the use of the

---

[12] "The national differences in types of music account for the differences in types of bows. The relatively straight bow stick for French dance music, the straight (or slightly outward-curved) and longer bow of the sonata players in Italy, and, among the Germans, bows of varying lengths with a more pronounced convex curve, perhaps related to their penchant for multiple stops." Ibid., p. 206.

left-hand as well as the thumb position.[13] Some of Lanzetti's fingerings reflect considerable insight, as shown by (for example) his choice of the modern fingering of the A major scale. The first cello treatise to include instructions for holding the cello was Michel Corrette's Méthode théorique et pratique pour apprendre le violoncelle (1741). Both calf position and standing up with an endpin were here prescribed. Three positions were offered for holding the bow.[14] Corrette's principles of fingering permitted the use of the third finger only in exceptional circumstances. For example, for the notes D, E, and F on the A string, fingers one, two, and four were employed. A more natural fingering method and the full acceptance of an over-hand bow grip is to be found in the next treatise of major importance--John Gunn's Theory and practice of fingering the violoncello (1793). This is one of the first works to deal directly with bowing. The violoncello treatise which ultimately formulated the basic playing principles in use today is Jean Louis Duport's Essai sur le Doigté du Violoncelle et sur la Conduite de l'Archet.[15] This treatise contained the most logical and

---

[13]"Since most of the cello literature was imitative of that of the violin, and in a very high register, the positions employing the thumb were not only invaluable but absolutely necessary at an early stage of learning." See Bacon, "The Evolution of the Violoncello", p. 106.

[14]"Corrette recognized the virtue of the bow in that all pure sounds were dependent upon the proper use of the bow, but gave no explicit direction or rules on the mechanics of drawing it across the strings." Ibid., p. 92.

[15](Paris: Janet et Cotelle, n.d.) The Library of Congress card for Iambault's publication of the work, with the same plate numbers gives the date as ca. 1806. An English translation by John Bishop entitled Essay on Fingering the Violoncello was published in London by Robert Cocks & Company (now Augener Ltd.) early in the nineteenth century. Only the 21 Etudes by Duport are now available. The original text is in two-part form (two celli) and only the edition by Ricordi retains this. All other editions give only the "solo" part.

musical method for both playing and teaching the cello up to its publication in 1806.[16] Duport's left-hand fingering and right-hand bowing techniques are idiomatically independent from those used by violinists at this time.

National Schools of Playing

Much valuable research concerning national schools of playing has been presented in a thesis by Gordon Kinney. Sources of information available to him were the following:

(1) For emphasis on German cellists: Wilhelm Joseph von Wasielewski, Das Violoncell und seine Geschichte (Leipzig: Breitkopf & Haertel, 1889); a second edition (1912) and a third (1925), revised and enlarged by Woldermar von Wasielewski, have appeared, as well as a very amateurish English translation by Isobella S.E. Stigand (London: Novello, Ewer & Co., 1894).

(2) For emphasis on Italian artists of the late eighteenth and nineteenth-centuries: Luigi Forino, Il violoncello, il violoncellista ed i violoncellisti (Milan: Ulrico Heopli, 1905). Revised edition: Editore-Librario Della Real Casa, 1930. This is out of print.

(3) For early details on French artists: Louise Antoine Vidal,

---

[16] "Duport proves by this treatise that he was not only a magnificent performer and virtuoso but also a serious and profound musician. It is obvious that he completely understood the fingering of the viola da gamba and based the fingering of the cello on the theory of a half-step per finger as being the most natural, whereas the gambists and theorists were unreasonable in not applying gamba fingering to the cello which resulted in methods with more exceptions than rules." See Bacon, "The Evolution of the Violoncello", p. 104.

Les instruments à archet, 3 vols. (Paris: J. Claye, 1876-78; facsimile reprint, London: Holland Press, 1961). Most of the biographies are in Vol. III.

(4) Based upon and expanding the work of Garnet C. and Arnold Trowell who published biographies of violoncellists in the first decade of the nineteenth century in Strad magazine: Edmund S.J. Van der Straeten, History of the Violoncello, the Viola da Gamba, Their Precursors and Collateral Instruments (London: William Reves, 1915).

The initial impetus for a school of cello performance came from Italy at the end of the seventeenth century.[17] Italian virtuosi stimulated local performers to imitate them; they established both national and local schools, and these schools influenced composers who were often the performers themselves. With the exception of a few outstanding Italian performers, however, little can be said of the general characteristics of an Italian school of violoncello playing. This is partially due to the preponderance of opera composition to the exclusion of instrumental music in the nineteenth century Italy. While such preoccupation by Italian composers did not hamper the development of a school of playing for the more popular violin, an Italian school of cello playing did not develop much past the end of the eighteenth

---

[17] "The career of the violoncello as a solo instrument initiated in Italy at the end of the seventeenth century was soon afterwards continued by Italian artists in other countries on the Continent and in England." See Gordon J. Kinney "The Musical Literature for Unaccompanied Violoncello", (Ph.D. dissertation in Music Theory, Florida State University, 1962), vol. I, p. 153.

century.[18]

The centers of playing in the nineteenth century, however, had been definitely established in Dresden, Paris, and Brussels. The German schools contrasted significantly with the Franco-Belgian schools of playing. While the former was exemplary in the cultivation of the left hand, passage work, and the upper register, the Franco-Belgian school cultivated a warmth of tone with a variety of bowing styles and nuances with the right hand. A Russian school of playing also developed, combining the attributes of both French and German schools.[19]

---

[18]"It was owing to this consuming preoccupation of Italian composers with operatic composition throughout the nineteenth century, to the virtual neglect of purely instrumental composition, that one finds nothing of moment to report concerning the development of the Italian school of playing except the contributions made by Piatti (1822-1901) near the end of the century." Ibid., p. 153.

[19]Kinney sums up the German school as follows: "The German virtuosi were famous for their great command of rapid execution in the high registers, which they achieved, however, sometimes at the cost of warmth of tone. They tended to disdain the cultivation of the lower register, in the production of a firm and steady tone of large sonority, and on the development of a wide range of emotional expression heavily underscored dynamically with dramatic accentuation ... sometimes to the point of roughness of articulation." He summarizes the Franco-Belgian school as follows: "Although the French never quite attained the same degree of mastery over the highest registers achieved by the Germans, in respect to the left-hand skills, they excelled the latter in purity of tone-production in all registers, in grace and variety of bowing styles, in subtlety of nuances, warmth of tone and in sustained smoothness in the singing style. The Belgians, in these attributes, resemble the French while the Central Europeans more nearly approach the style of the German school." Kinney describes the Russian school as "like the French, tending to avoid the German preoccupation with left-hand technique at the expense of tone, but on the other hand, like the Germans, scorning the more exhibitionistic traits of French bowing and instead cultivating as their main characteristic the production of a large sonority of sensuous richness and grandness of delivery with little attention to the more delicate varieties of timbre and nuance." Ibid., pp. 186-187.

Some key figures of the Italian, French, Belgian,and German schools should be mentioned in order to bring to light those musical activities contributing to the emergence of the violoncello as a solo instrument. An important Italian figure is Luigi Boccherini (1743-1805). His endeavours brought him from Italy to Spain and France. A characteristic quality of his prodigious musical output is the infusion of an Italian Rococo spirit into chamber music. In addition to five cello concerti and twenty-seven sonatas, he wrote 113 string quintets using two celli. In these works, the technical demands of the cello parts did much to stimulate the general level of playing in his time. Another Italian figure worthy of mention is Alfredo Piatti (1822-1901), whose advanced concert studies Dodici Capricci, Opus 25, have achieved a lasting place in the étude repertoire.

After the accomplishments of J.L. Duport,[20] the French school of playing was carried on by a pupil of the elder J.P. Duport, John Crosdill (1751-1825) in England. The French school was carried on in Belgium by Nicolas Platel (1777-1835). A pupil of Platel's, Adrien François Servais (1807-1866) was responsible for promoting the use of the endpin.[21] The endpin not only increased the resonance of the cello, but also did much to free the player physically. Servais owned a 1701 large Strad (Basso di chiesa), and, being fat and opposed to any alteration of the instrument itself, he chose to remedy the "inoperable"

---

[20]"Beethoven knew both Duports (father J.P. and son J.L.) in Berlin, performing his Opus 5 Violoncello Sonatas with one of them. He also met Romberg (1776-1841) at Bonn." Ibid., p. 177, n. 166.

[21]"It was thought to be an innovation of the time, but endpins were in use in the seventeenth century in performances in churches and other places where the violoncellist was required to play standing." Ibid., p. 169, n. 147.

viola da gamba calf-playing position with an endpin.[22] Another exponent of the French school after Duport was August Franchomme (1808-1884). He was Delsart's predecessor at the Conservatory in Paris and was a close friend and collaborator with Chopin. He wrote 12 Caprices, Opus 7--advanced études of unusual charm and beauty.

Unlike the French school, confined as it was to a single center in Paris, the German school developed in multiple regions. While the fragmented political structure of the nation resulted in the development of diverse methods in Dresden, Leipzig, Berlin, and Hamburg, there were common features among the playing styles. The technical level of playing in Germany in the early eighteenth century is often considered by historians to be quite high due to the appearance of the Bach Suites in 1720. Kinney suggests the more plausible explanation that these Suites were intended as experiments to demonstrate the adaptability of viol chordal styles to the violoncello. This is especially plausible due to the uniqueness of the Bach Suites.[23]

The first significant exponent of a German school of playing was Anton Kraft (1753-1820). He had an important influence on Austrian

---

[22]"His innovation was at first strongly opposed by traditionalists...to the point of refusing auditions to applicants for scholarships at the Paris Conservatory if they used endpins. It rapidly won favor because of the example of so eminent an artist (Servais), and in 1884 Jules Delsart (1844-1900) reflected the trend by making the use of an endpin by students at the Conservatory an official requirement." Ibid., p. 170.

[23]"These compositions were practical experiments to demonstrate that the chordal style of contemporary French and German solo music for the viol could be idiomatically adapted to the violoncello. Their very uniqueness in the literature of the instrument tends to confirm this conjecture for not even subsequent to Bach's have imitations of their style appeared in the literature for unaccompanied violoncello prior to the suites by Max Reger (composed around 1915)." Ibid., p. 173.

and German composers. This was primarily through his association with Haydn, as his violoncellist at Esterházy, and with Beethoven. Haydn's famous Cello Concerto in D major was written for Kraft. He and his son Nicolous (1778-1853) played chamber music with Mozart at the Dresden court.

The first real leader of a German playing style is Bernhard Romberg (1767-1841). His activities were centered in Hamburg, though he toured widely. Romberg added to the brilliant technical achievements of Boccherini, especially with his thumb-position studies which included the use of the fourth finger. His style of playing acted as a transition from the classical one of J.P. Duport, the elder to the romantic style of Weber and Spohr. His method book was officially adopted in 1841 by the Paris Conservatory, where he had taught from 1801 to 1802. His uninspired musical tastes however, did little to motivate the composition of works of lasting value for the violoncello repertoire. Romberg did not stimulate composition by major composers such as Beethoven, Mendelssohn, Chopin, and Schumann, nor did he promote performances of the few outstanding works that were available at the time.[24] These works received, at the time of their initial appearance, far fewer performances than the banal exhibition pieces the virtuosos wrote for their own use.

Justus Friedrich Dotzauer (1783-1860) founded the Dresden

---

[24]"Romberg, unfortunately was singularly lacking in an appreciation for Beethoven, music which he told Spohr was'absurd stuff' and as a result of his obtuseness in this regard, subsequent violoncello composers, who modelled their style on his but were wanting in his talents of composition, produced huge quantities of sterile and insipid works motivated by a vulgar urge to display virtuosity--works fully deserving the oblivion in which they now rest." Ibid., p. 178.

school of violoncello playing. Called the "Czerny of the violoncello" due to his huge quantity of didactic works, Dotzauer's technique was based upon the study of Romberg's concerti.

Friedrich August Kummer (1797-1879) was a pupil of Dotzauer. His method (disseminated in Italy and England by his advocate Piatti) and his numerous publications are still widely used. He cultivated Romberg's disdain for lighter bowing effects, such as staccato, spiccato, and saltando, deeming them Gallic tricks. This attitude typified the division of Franco-Belgian and German schools throughout the nineteenth century.[25]

Another outstanding exponent of the German school was Friedrich Grützmacher (1832-1903). His own technical virtuosity reached a level of development comparable with that of Paganini. In Kinney's opinion, his Technologie des Violoncellspiels, Opus 38 is unsurpassed by any didactic work for the violoncello up to the present day.[26]

David Popper (1843-1913) was a pupil of Julius Goltermann[27] who in turn studied with Kummer. His successful salon pieces occupy a position in the violoncello repertory analogous to the one held by those

---

[25] "One result of it was that many performers, in order to complete their technique, would first go to Dresden to perfect their left-hand mechanism, and then go to Paris or Brussels to acquire a more graceful and flexible style of bowing and a more expressive vibrato. This dichotomy still prevails, though now gradually modified by certain modern principles that have gained practically universal acceptance." Ibid., p. 180.

[26] Its content is extensive. For example, ascending and descending chromatic scales slurred over four octaves; fingered octaves; double trills; double artificial harmonics; up-and down-bow staccato and all the lighter bowings; chords in the high register; and so on.

[27] Not to be confused with Georg Goltermann, the composer of sentimental violoncello concerti still played by students today.

of Fritz Kreisler in the violin repertoire.[28] He also wrote cello concerti and an excellent suite for two celli. He was the only composer to produce a concert work for unaccompanied cello in the nineteenth century--his Präludium fur Violoncell Solo, Opus 27, No. 1. His études, Highschool of Cello Playing, Opus 73 are widely used today.[29]

It was only in the last third of the nineteenth century that the endpin came into general use. The schools of Romberg, Dotzauer, and Kummer still positioned the instrument between the calves. Popper's use of the endpin facilitated left-hand technique by both relieving the general body tensions and by creating a more serviceable angle of the fingerboard. Popper is also noted, along with Carl Davidoff (1838-1889), for improving finger velocity by a change in the left-hand position. The left-hand knuckles were placed in a line more parallel with the strings. In violin and gamba playing, the knuckles are used with a considerable angle to the strings. This improvement signified another advance in freeing cello technique from violin and gamba models. Popper also played with the left arm further away from the side of the body

---

[28] "I do not scorn the older bravura compositions of the cello repertoire if they have musical worth. I try not to be pedantic. Take Popper for instance. Many of his pieces have much musical charm besides being brilliantly written. What he has done is excellent in its way, and I try to give my performance of his pieces all the interest the music contains. Popper, after all, was one of the best of the older cello composers, and he had a distinct gift for finesse and charm. I am always sorry to see people turn up their noses when Popper's name is mentioned, and imply that he is not worth while; for all that he has written for the cello was well conceived and musically written." See Frederick H. Martens, String Mastery (New York: Frederick A. Stokes Co., 1923), p. 234.

[29] As evidence of the artistic appeal of his works, the Violoncello Society of New York recently devoted an entire evening program to Popper's music. See Figure 1.

FIGURE 1: TRIBUTE TO DAVID POPPER

Violoncello Society, Inc.

140 WEST 57TH STREET, NEW YORK, N. Y. 10019 TEL.: 246-3267

HONORARY PRESIDENT
Gregor Piatigorsky

PAST PRESIDENTS
Bernard Greenhouse (1956-61)
Janos Scholz (1962-67)
Alan Shulman (1967-72)

PRESIDENT
Lillian Rehberg Goodman

VICE PRESIDENTS
Zara Nelsova
Alan Shulman

SECRETARY
Arthur Aaron

CORRESPONDING SECRETARY
Esther Prince

TREASURER
Nathan Kogan

BOARD OF DIRECTORS
Claus Adam
Evangeline Benedetti
Jascha Bernstein
Alexander Brovde
Orlando Cole
Jean Schneider Goberman
Bernard Greenhouse
George Koutzen
Alice Launer
Ronald Lipscomb
Barbara Stein Mallow
Paul Olefsky
Channing Robbins
Daniel Saidenberg
Janos Scholz
Jascha Silberstein

December 17, 1974

DAVID POPPER, Master Cellist, Teacher, Composer, Performer

will be the subject of our first get-together

Monday Evening, January 13, 1975, 8 PM at the Kosciuszko Foundation, 15 East 65th Street, NYC

The Participants for the evening will be: Orlando Cole, Barbara Stein Mallow, Janos Scholz, Rebecca Seiver, Sara Seiver, Alan Shulman and Jascha Silberstein.

The Program will comprise:

A Commentary on the Life and Work of David Popper
Performances of his Etudes with piano accompaniments composed by Alan Shulman
Several representative pieces in the repertoire.

A social get-to-gether will follow. As always $2.00 admission exclusive of members' husbands or wives.

This will be a stimulating and exciting evening, so please join us.

Cordially yours,
Arthur Aaron
Arthur Aaron

COMING EVENTS

Our NEWSLETTER devoted to David Popper will be sent shortly.

PAUL TOBIAS - Mon. Jan. 6, 8 PM, Grace Rainey Rogers Aud. (Metropolitan Museum of Art

NEXT MEETING - Feb. 10th - Claus Adam's Concerto for Cello will be performed by Stephen Kates (Commissioned by the Ford Foundation)

Violoncello Society Aims:

...promote the art of 'cello playing in this country; to provide a common meeting ground for professional and amateur 'cellists; to promote interest in the 'cello as a solo instrument; to provide opportunity of performances for artist and composer; to develop a broader and more mature understanding of the art of the 'cello; and to further the members' artistic development.

than had been the practice previously. Such innovations promoted a more fluid transition between lower and upper hand positions than was available to Kummer or Dotzauer, both of whom played with a rather flat finger position and with the left arm held close to the body.

CHAPTER II

THE PEDAGOGICS OF CELLO PERFORMANCE

The Cortical Control of the Physical Apparatus

The first area of concern for the pedagogue of cello performance has very little to do with the instrument itself. Indeed it is only when the teacher first removes the cello and bow from consideration that the player is able to discover the most efficient use of a more basic instrument--his own physical body. Only after such a discovery can the cello become reintegrated as an inseparable extension of this physical apparatus; only through a sensory awareness of the one can the cellist develop his sensibilities to the other. By proceeding in this way, the student will learn to break his "identification" with the cello, a phenomenon which varies in degree but is in all cases both habitual and a manifestation of "unconscious behavior."[30]

It is worthwhile to discuss at length this afore-mentioned "efficient use" of the physical body because it constitutes in essence the dynamic foundation of all cello playing. Dr. Ida Rolf in her article "Structural Integration" states: "The level and quality of the inner energy of man is limited by its pattern."[31] In her investigation, she attempts to trace a relationship between the behavioral patterns of

---

[30] In discussing his early reform of existing pedagogic attitudes, Casals regards the instrument as a musical rather than a technical device. "I wanted to avoid laying the main stress in cello playing on the virtuoso side, to avoid stressing the importance of the cello as an instrument for producing music, and instead make it a more perfect musical instrument." Quoted in Martens, String Mastery, p. 227.

[31] Systematics, I (June, 1963), p. 74.

organic and inorganic subtances. Chemists have always known that the spatial arrangement is fundamental to the behavior of a substance. For example "microscopic examination shows salt crystals whose edges are sharply defined and whose plane surfaces meet at specific definite angles. Any deviation from these indicates an admixture of some other material, a so-called 'impurity.' Any deviation makes its chemical behavior less predictable."[32] Dr. Rolf then postulates an idealized pattern for the human body in order to transmit and utilize the gravitational field of the earth to better advantage. She notes the typical irregularities of postural patterns between people as well as the virtual deformities which these in time render to the bones and muscles of the organism. She concludes by stating the advantages of balanced "block-stacking" of the head-thorax-pelvis-legs around which all our smaller patterns of movement should occur. With this postural perspective, the forementioned "level and quality of inner energy" is greatly enhanced:

> Muscular balance, however, has a broader and more urgent significance than mere co-ordination or even aesthetic appeal. It is the outward and visible sign that vital communications are functioning freely. Communication, in this sense, refers to the actual flow of body fluids in their role of transmitting metabolic and hormonal substances, as well as to the free transmission of nervous currents. [33]

It is with these "fundamental balances" that some of the more searching pedagogic speculations are concerned.[34] The various physical

---

[32] Ibid., p. 74.

[33] Ibid.

[34] "The New Approach leads to an organized way of dealing with our desire to move. It helps one to break through the barriers of tension and mobility." See Claude Kenneson, A Cellist's Guide to the New Approach (New York: Exposition Press, 1974), p. 19.

postures required in cello playing are best viewed in terms of facilitating a release of energy. The free flow of movement is the goal at all times. Physiological studies reveal that "when we are standing or sitting, considerable muscular power must be applied to overcome the force of gravity. [However] in order to increase efficiency in muscular work one has to strive to maintain a posture which does not demand too great an effort from the muscles."[35] Professor Kenneson relates the cellist's "repertoire of movements" to his sitting posture which he believes must be one of continual search for balance, that is, movement.[36] It is important to be aware of the range of movement appropriate to various limbs of the body. The evolutionary process clearly demonstrates the principle of "use determines functioning" in the leverage mechanisms found at different stages of development between quadrapedal and bipedal life forms:

> In upright posture, the upper limbs are relieved from carrying the weight of the body and become freely moveable. The evolution of the structure corresponds to these dynamic peculiarities, while the structure of the lower limbs is similarly conditioned by the static duties they are to bear.[37]

A further examination of the attributes of muscular movement

---

[35]Otto Szende and Milhaly Nemessuri, The Physiology of Violin Playing (London: Collett's Ltd., 1971), p. 30.

[36]"The successful use of the body's natural repertoire of movement depends to a great degree on the player's attitude toward the exploration of his sitting posture. The player moves away from the New Approach when he fits himself to the cello in order to fulfill a postural attitude pictured in a "method" book, or imitates the visual appearance of another player." See Kenneson, Cellist's Guide, p. 22.

[37]Szende and Nemessuri, Violin Playing, p. 42.

reveals the phenomenon of "antagonism" between muscle groups:

> In electromyographic study of movement we are not interested in only the prime movers activated by will. We are just as interested in the activity evoked reflexively in the antagonists which may be called upon to exert a modulating tension, the synergists, which may neutralize some unwanted action of a muscle which has the capacity to perform more movements than one, the fixators, which may be needed to stabilize continguous joints or more remote parts.[38]

It was only due to advanced technological methods of observation and the recent scientific discipline of electromyographic kinesiology that the secrets of man's remarkable capacity to execute complex movements with effortless grace have become known. This knowledge has taken the place of inferences arrived at from cadaver dissection. It also lends support to recent pedagogic efforts which attempt to define in physical processes the same dynamics which operate in psychic processes and then to unify the two in the total process of musical expression.[39]

F.M. Alexander was a pioneer in the field of determining the causes and cures of poorly functioning human machines. He was himself a dramatic orator whose unpredictable loss of voice at times of intense

---

[38] F.A. Hellebrandt, "Living Anatomy," Quest, I (December, 1963), p. 49. This article was also printed in William S. Middletor, Festschrift, Wisconsin Medical Journal, LXIII (November, 1964), pp. 25-35.

[39] A good example is Kato Havas' approach to violin playing which has elicited the following observation: "Through the New Approach I was able to do three things: (1) identify the tensions and anxieties which beset the majority of players; (2) understand key movements which release instant action and co-ordination; (3) trace the basic motivations which underlie violin playing; and, (4) understand the physical balances involved in playing the violin and how the co-ordination of these balances is achieved." See Elizabeth Chapman, "The 'New Approach' in the Violin Class," Journal of the American String Teachers' Association, (Spring, 1970), p. 3.

emotional stress could not be traced medically to any visible disease or virus. Finally after an extensive use of mirrors and self-examination of the "means whereby" he was using his voice, he was able to demonstrate the existance of a misdirection of activity both in the degree and sequence of muscle excitation. He discovered that he would unnecessarily upset and subordinate the total body pattern of muscular balance to smaller patterns of localized movement. For example, he observed that in obeying a command to use his voice, he simultaneously displaced the position of his head in relation to his spine, pulling it back and down. This of course interfered with the action of his larynx and with his respiration, causing muscle strain and ultimate loss of voice. Furthermore, this misuse was both habitual and unconscious; his sensory appreciation was untrustworthy when habitual misuse became so familiar that it began to feel right, comfortable, and necessary.[40] Only after Alexander had invented a sequence of consciously controlled mental directives involving "stimulus-inhibition-projection of new orders" could he succeed in re-educating his kinetic behavior.

> Conscious direction of use gives the opportunity for testing continuously the validity of the sensory observations and impressions of what is taking place, because all the time that they are consciously projecting directions for the new and improved use, they are obliged to go on being aware whether or not they are reverting to the old instinctive misdirection of their use which, associated with sensory untrustworthiness, had led them originally to be deceived in what they

---

[40]"There was clear proof that at the critical moment when I attempted to gain my end by means which were contrary to those associated with my old habits of use, my instinctive direction dominated my reasoning direction." See F.M. Alexander, The Use of the Self (New York: E.P. Dutton & Co., 1932), p. 26.

were doing with themselves.[41]

Pedagogues err seriously when they attempt in the initial stages of teaching to deal directly with the student's relationship to the musical instrument itself. If they dealt first with the pupil's "debauched kinesthetic systems," defects common to varying degrees in all individuals, many problems and perplexities incurred by the pupil during the learning process would vanish.

The Psychological Apparatus and its Subcortical Controls

The discussion of a pedagogic approach to the total musical performance began by showing the need to first eliminate the cello as an area of consideration in favor of the physical body. Having eliminated this one "machine," it is now possible to bypass yet another: the physical body itself. Once kinesthetic awareness has been improved through cortical control and conscious guidance, it is imperative to permit this activity of the mind to pass to sub-cortical, autonomous levels of activity.[42] Reference has already been made to Dr. Hellebrandt's thesis that learning does not occur exclusively along efferent lines; all physical acts are not directly amenable to volitional control. It remains to be clearly demonstrated what other levels of the brain should be operating in the process of cello playing. If we can establish the

---

[41] Ibid., p. 119.

[42] "Until the mindless operation of postural mechanisms is established through volitional subjugation of cortical interference, the evolution of effortless and graceful natural movements over automatic primordial pathways is impossible." Hellebrandt, "Living Anatomy," p. 279.

physiological process of the delegation of responsibility to different layers of the brain, we will be able to understand the degrees of consciousness appropriate to the intellectual, emotional, and physical activity in music making.

On the subject of volition, Dr. William Goody states:

> Voluntary movement is known from afferents (sense organs) which are mostly "subconscious" or received consciously so habitually as to be disregarded unless attention (itself a sensory concept) be called to it.[43]

He states further that willed movement is never predetermined:

> The willed movement, the precurrent reaction as it so commonly is at the start, is not characteristically predetermined in form, duration, or complexity, for it is moulded throughout its course by impulses deriving from the visual "exteroreceptors" and "proprioceptors".[44]

Dr. Goody goes on to elucidate the fundamental point that in the acquisition of performance skills, the student effects as voluntary movement the stimuli from his senses. "But he is not learning 'patterns of voluntary movement' as we are so often told. He is learning patterns of sensation."[45] The use of this knowledge makes it possible to distinguish cause from effect.[46]

---

[43]William Goody, "Sensation and Volition," Brain, LXXII (September 1949), p. 318.

[44]Ibid., p. 315.

[45]Ibid., p. 323.

[46]"Those who play the piano will readily admit that once a piece is learnt, break-down comes from sensation... One of the very common features of diminishing skill is an increased awareness of what the whole body is doing. By an effort of 'forgetting' and 'thinking of something else' one may sometimes avoid the unbalancing new afferents before it is toolate." Ibid., p. 325.

Earlier simplistic concepts of movement control, as depicted in Figure 2, considered the brain as a "black box" too complex to be understood. This formulation is in direct conflict with those of Dr. Goody. This model explains neither the co-ordination of muscle groups nor their modulating movement by feed-back to the brain. The brain here is a keyboard; each muscular response results from the depressing of certain key.[47]

We must now illustrate the delegation of responsibility to the various levels of the brain. Dr. Hellebrandt states:

> More is involved in the physical aspect of violin playing than stopping the string and drawing the bow. Parts far removed from those called consciously into action may affect the end-result.[48]

In Figure 3, a more dynamic understanding of the brain is depicted which considers cortical and subcortical layers and appropriate activities for each. When the student is confronted with an étude, the cerebrum alone discerns the intent of the study through logical and analytical processes. The idiomatic requirements are clarified. However, during the actual physical acts performed, the cerebrum only initiates the acts and provides variable degrees of surveillance. It does not need to direct the course of events. This happens subcortically in the cerebellum.

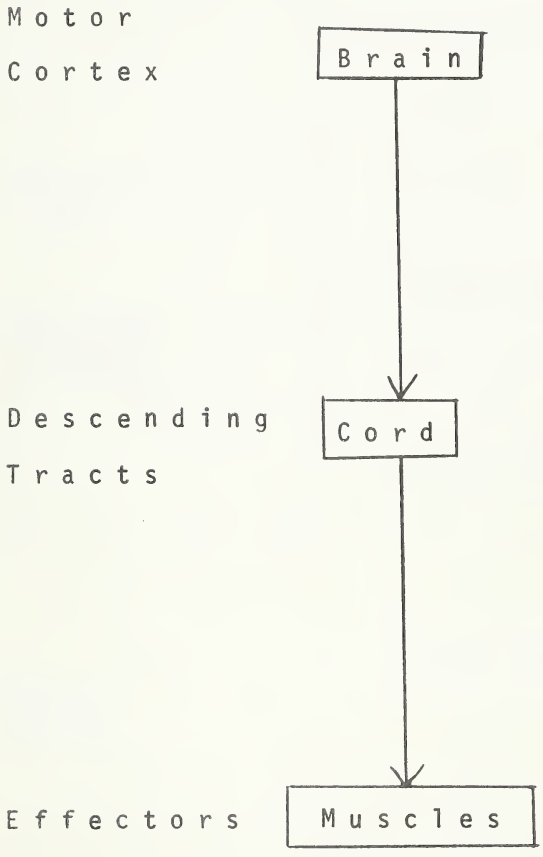
---

[47]"It is hard to realize that only 200 years ago the brain was thought by our forefathers to consist of a concoction of spirits which might be pure or tranquil, or riotous and evil." See Ritchie W. Russell, Brain, Memory, Learning (London: Oxford University Press, 1959), p. xi.

[48]Paul Roland, Development and Trial of a Two Year Program of String Instruction (U.S. Department of Health, Education, and Welfare, 1971), p. 166.

Figure 2[49]

EARLY SIMPLISTIC CONCEPTS OF MOVEMENT CONTROL

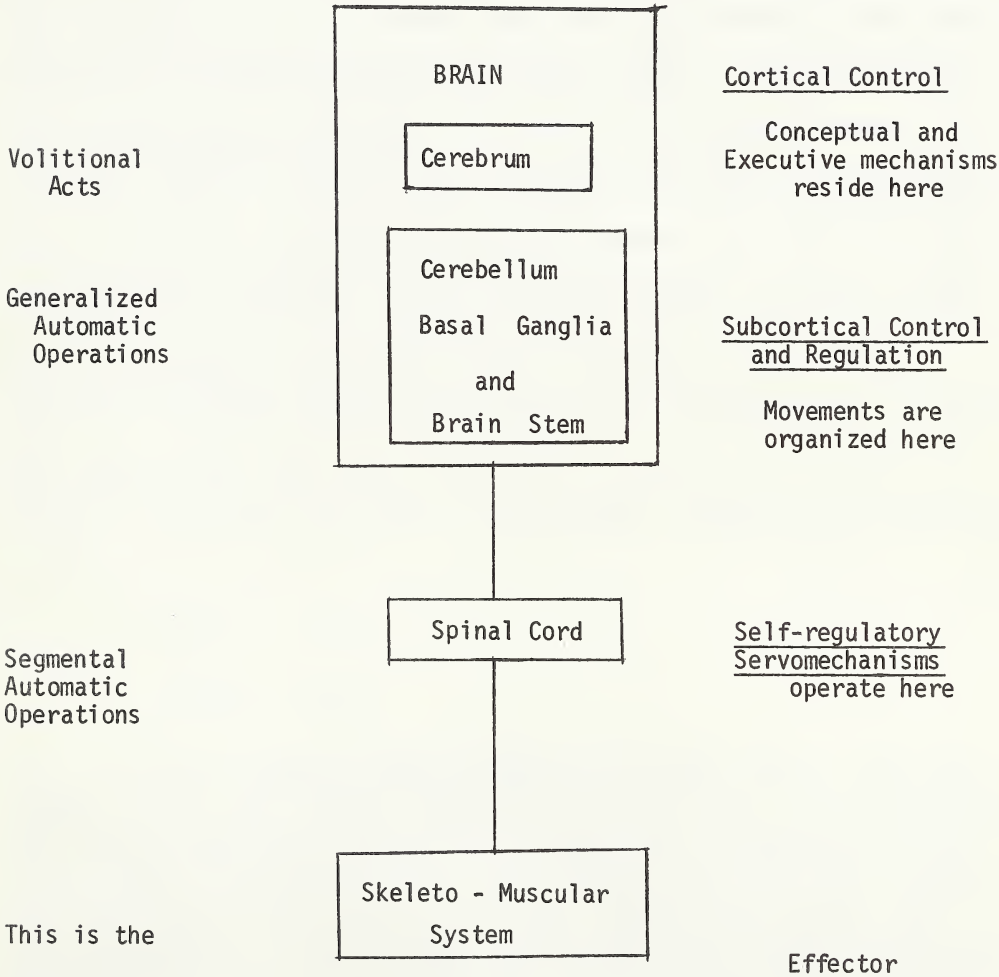


[49]Roland, String Instruction, p. 157.

Figure 3[50]

A N A T O M I C O - P H Y S I O L O G I C A L O R I E N T A T I O N

PREVIEW OF HIERARCHICAL LEVELS OF OPERATION



[50] Ibid., p. 155.

> The highest centers in an hierarchical control system can always over-ride lower regulatory mechanisms. Thus, the cerebrum may or may not choose to control the details of the operation. The teacher greatly influences the rate at which the specific conscious direction of physical acts being practiced is relinquished.[51]

Figure 4 depicts further the hierarchical system of multiple interdependent closed loops, most of which occur subcortically. Older research paid attention only to the larger loops which in kinesthesia (the sense perception of movement) bombard the higher centers. Little was known about proprioceptive-impulses. Only later did it become apparent that "automatic sensory feedbacks (the alternation of input by output) might be as essential to the control of willed movements as voluntary executive orders."[52] However, a term like "muscle sense" is largely a misnomer (see Figure 4). In actual fact, the messages from receptors implanted in muscle tissues never directly reach consciousness. It has been demonstrated that when the cerebrum of the brain is removed, the vital life functions can continue unimpaired.[53] Pedagogically speaking,

---

[51] Ibid., p. 154.

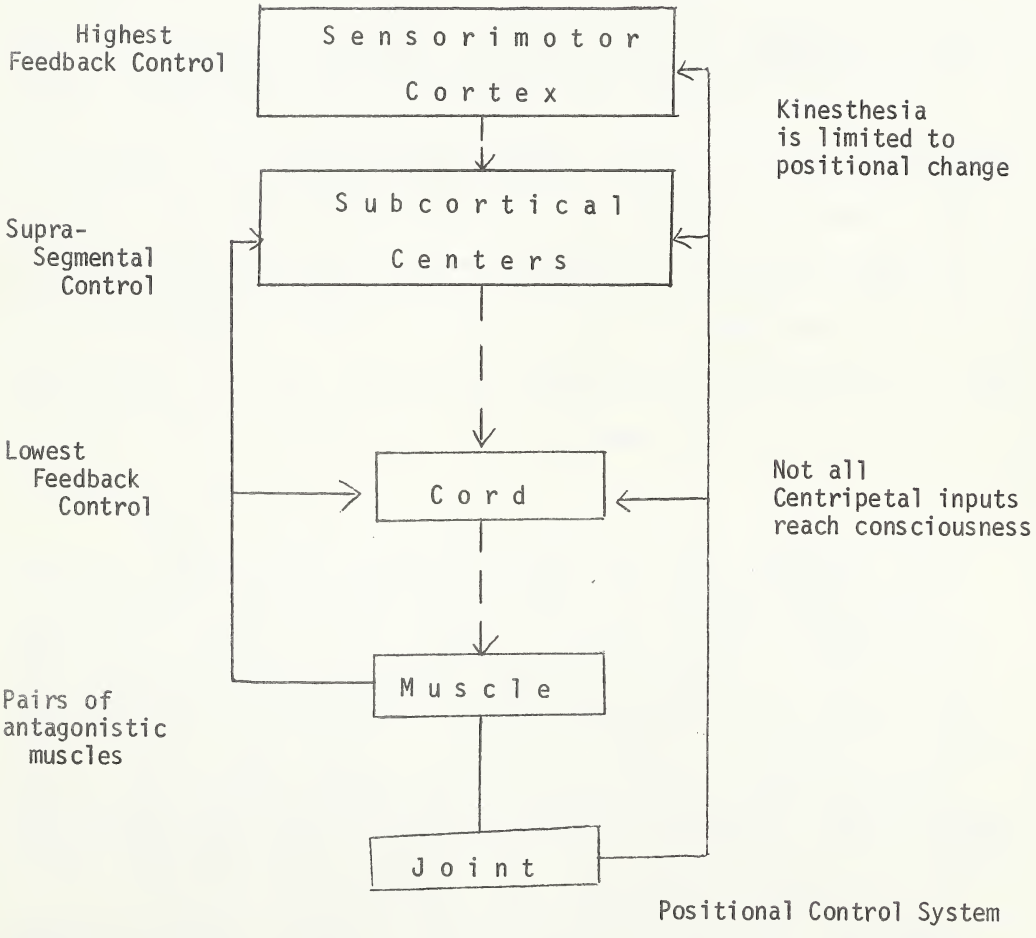
[52] Ibid., p. 160.

[53] The cerebrum is associated with the intellectual faculties in man and also exerts a guiding influence over the rest of the nervous system. It is not, however, necessary to actual life. If the cerebrum of a frog be destroyed, it will still breathe and its heart will beat, it can hop if pinched and swim if put in water, but when left alone it sits still till it perishes. If the same happened to a pigeon, it can fly when thrown in the air and can alight, but it does not fly away when threatened, nor will it take food, having lost even the instinct to preserve life. If, on the other hand, the cerebellum of the pigeon be destroyed, the bird cannot maintain its balance, the cerebellum being concerned with the regulation of muscular movements and in preserving the equilibrium." See Black's Medical Dictionary, 29th ed., ed. by William A.R. Thompson (London: Adam and Charles Black, 1971), p. 136.

Figure 4[54]

BUT VOLUNTARY MUSCLES
ARE INSENTIENT

"Muscle Sense" is a Misnomer



[54]Ibid., p. 165

only once the concious mind has been freed from direct supervision of physical technique can it begin to formulate and direct musical data of an intellectual and emotional nature.[55]

The Relationship of the Cello to the Player

Thus far, the discussion has reviewed a pedagogical approach to cello performance in which the cello is at first disregarded while the "physical machine" is re-educated in sensing balance and efficient movement. The kinesthetic awareness of these patterns of movement are then trained to submit to subcortical control.[56] Afterwards, the cello is reintegrated into the performance process. At this point it is necessary to discuss the relationship of the cello to the body and to define the basic left- and right-hand gestures required in using the equipment of instrument and bow. Then the rationale for a music-making process with the sequence of events: (1) musical ideation; (2) left-hand gesture; and, (3) right-hand gesture can be seen as a welcome approach to problems of

---

[55]The spontaneous operation of the physical apparatus can be seriously impaired when the cello student makes value judgements about its performance. This constitutes a misuse of emotions and further promotes volitional controls. Tennis instructor Timothy Gallwey states: "When one has tried hard to perform an action 'right', it is difficult not to become either frustrated at failure or excited by success. Both these emotions are distracting to one's concentration, and prevent full experiencing of what happens. Negative judgement of the results of one's efforts tends to make one try even harder; positive evaluation tends to make one try to force oneself into the same pattern on the next shot. Both positive and negative thinking inhibit spontaneity." See W. Timothy Gallwey, The Inner Game of Tennis (New York: Random House, 1974, p. 82).

[56]"It is highly probable that professional violinists and teachers, steeped in years of habitual ways of using their instrument, would also find it difficult to submit to subcortical controls." See F.A. Hellebrandt, "The New Approach to Violin Playing," Strad, 80 (1969), p. 363.

cello playing.[57]

The relationship of the cello to the body should be such that there is no feeling of "holding the cello." As discussed in Chapter I, one of the historically-evolved features of the instrument, the endpin, is important in facilitating this freedom of physical movement.[58] Several contemporary pedagogues continue to direct attention to the topic of physical mobility as an area for potential disturbance. Kenneson states:

> An increasing effort is being made by some modern players to rid themselves of excessive contact with the instrument. The left hand must merge with the fingerboard, and the bow must cling to the vibrating string while the body lightly touches the cello, creating an elastic bond.[59]

Much consideration has been given to the appropriate position of the spine, which should be neither excessively arched nor collapsed in the sitting posture. It must be pointed out, however, that there are a number of natural curves in the total contour of the spine (cervix to coccyx). Therefore, the best guarantee of the free play of movement in the sitting posture is to allow the muscles and tendons to be free and flexible in both hip joints. Then the forward-and-back, side-to-side "axis of movement" of

---

[57]"There are certain almost subconscious actions -- some the result of well-trained muscular development, other of a purely personal character--that can affect cellists of all grades for good or evil. These are either trustworthy reflexes or unwanted mannerisms." See M.B. Stanfield, "Reflexes," Strad, 78 (August, 1967), p. 139.

[58]In violin playing, the rigid holding of the instrument can produce stage fright. Kato Havas traces one of the primary causes of stage fright to the fear of dropping the violin: "The very thought of having to hold the violin is enough to create rigidity all over his body, including his knees." See Kato Havas, Stage Fright (London: Bosworth & Co., Ltd. 1974), p. 18.

[59]Kenneson, Cellist's Guide, p. 19.

the shoulders and torso will not require a re-shaping of the spine by re-arching or re-curving this layered bone structure. The "integrity" of the spine unit, "cervix to coccyx," must be maintained in all movements in the sitting position (see Figure 5).[60]

The Suspension of the Arms

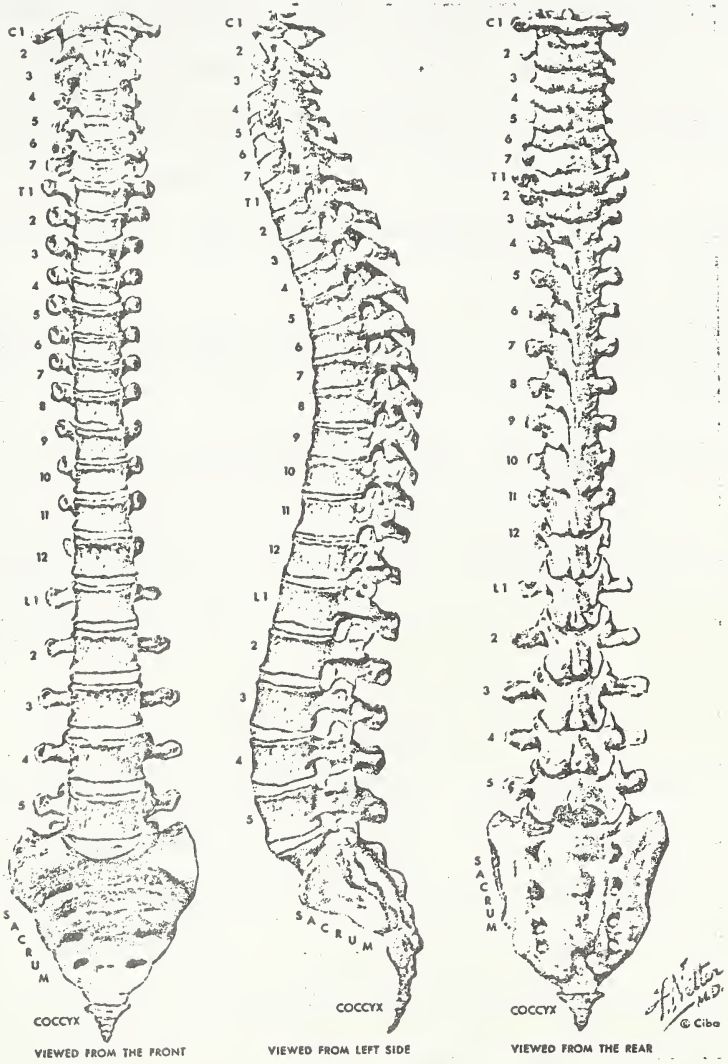
Once the appropriate position is established (non-position would be more apt), the most important physical sensation for the student to maintain is one of suspension of the arms. Only thus can the correct left- and right-hand gestures be achieved. The first place to look for the cause of inefficiency in bowing or fingering is in the player's kinesthetic sense of his upper limbs.[61] Consequently, the next check-point after the hip joints are both of the shoulder joints. In cello playing, the pressure on the bones of the chest by the hard wooden edge of the instrument (a sensation which is to varying degrees less acute for the female) stimulates a desire to cushion the "impediment" by hunching over the cello. In addition, the position of the hands in cello playing is in front of the body, drawing the shoulders forward; the proximity of the finger board to the chest and the more favored use of the lower half of

---

[60]Cello students have forever been told to sit on the edge of the chair in ritual fashion. But many symphony cellists can be seen more deeply "planted" using the back-rest of the chair for support. To resolve this enigmatical disparity, the cellist need only remember the simple rule: by minimizing contact by the body with a hard surface, one maximizes his feeling of mobility.

[61]"Right and left hand techniques of the New Approach [of Miss Havas] differ significantly from traditional practices. They demand an arm supported by suspension and not by lifting. One augments and the other inhibits freedom of movement in the shoulder joint." See Hellebrandt, "New Approach," p. 309.

Figure 5[62]



---

[62] Frank H. Netter, Nervous System, Vol. I of The Ciba Collection of Medical Illustrations, 5 vols. (Montreal: Ciba Company, Ltd., 1953), p. 21, Pl. I.

the bow cause the right and left arms to work in an area close to the body. The result of such factors over a period of time is a condition of "collapsed chest" and shoulder joints in which movement has become reduced. (A position simulating this condition is the posture of arms folded across the chest pulling the shoulders forward and downward.) Since the suspension of the arms necessary for proper right- and left-hand gestures depends upon a flow of energy unimpeded by such blockages, the player must seek the physical experience of widening across the chest and thereby opening the shoulder joints as well. In fingering, the left shoulder joint remains open when the arm is suspended away from the body. In bowing, the up-bow stroke must not permit a permanent closing of the right shoulder joint, inhibiting its re-opening on the down-bow stroke.[63] The player must cultivate sensations both of unimpeded movement and of openness throughout the physical apparatus.

Right-Hand Gesture

In the total hierarchical system of leverage, the motivation to movement must always begin from the larger muscles and joints. The deliberate cultivation of hand motions in isolation from the rest of the arm, so common in string pedagogy, displays a gross confusion of cause and effect. It is difficult to understand the widespread ignorance of this fundamental principle of physiology. A correct analysis of the action of the thirty bones in the arm would reveal the following:

---

[63] All osteopathic treatment consists in opening up just these kinds of "channels" around joints to insure appropriate pulsation in the flow of lymphatic fluids.

> Each succeeding joint from the shoulder downwards to the finger tips possesses a more limited range of play than the preceding one, and is therefore subordinated to it. For that reason, the idea of making active wrist or finger movements must be rejected; in a combined action from so many joints, the smaller parts of the arm should merely act in response to the more important bigger ones which are carrying them, and their function is not unlike that of a set of extraordinarily adaptable springs.[64]

The effect of movement in the smaller muscles and joints are caused by activity in the next larger ones. It can even be demonstrated that "it is possible to lift the arm to the height necessary to play on any given string without contracting a single muscle having its origin in the arm itself."[65] The actual map of the muscular distribution of the limbs is:

> to move only the hand from the wrist joint the muscles called upon are situated in the forearm; to move the forearm, upper arm muscles are used; while to move the whole arm requires muscles which, though attached to the upper arm, have their origin in the trunk.[66]

Consequently, we should always think of the upper arm as being moved by muscles in the body, the forearm by the upper arm, and the hand by the forearm. Thus the function of the smaller levers in the playing of "whole-bows" is to transmit the power and action of the larger levers. When the player is told to begin the down-bow by opening the elbow-joint hinge, thus moving the forearm, he is being taught to violate a natural order of movement. And while use of smaller levers for smaller movements ostensibly is mechanically sound, as in spiccato bowing in which the hand

---

[64]Percival Hodgson, Motion Study and Violin Bowing (Urbana: American String Teachers Association, 1958), p. 5.

[65]Ibid., p. 4.

[66]Ibid., p. 3.

motion exceeds that in any other part of the arm, the stationary appearance of the larger levers is only an illusion. In spiccato bowing, the isolation of hand motion by holding the upper arm still requires extreme muscular effort. The leverage created naturally by antagonistic pairs of muscles (in which one contracts while the other elongates) is impeded when both are contracted at the same time. Only tension and fatigue can result. The detrimental effect that such artificial methods have on tone quality will be discussed shortly.[67]

With the right distribution of muscular activity in the arm motions, optimum mobility is insured in the three joints: shoulder, elbow, and wrist. Kenneson states:

> The movement of these check points will display their free action and will dispel any tension. It is in the area of these three major check points that tensions gather during playing. By moving these joints, tension is dispelled.[68]

Incorporation of the Bow Into the Right-Hand Gesture

Once the "natural" use of the arm has been established, the cellist can insert the bow into the hand and activate the strings. It is notable that the pedagogic procedure again consists of first removing a piece

---

[67]The converse situation results when the larger muscles are overactive in a particular movement. "Assuming a pull equal to a certain weight to be necessary to raise the arm to a given position, it is clear that the muscles should only be contracted as much as is needed to create precisely that pull. If too much power is used, a brake has to be contrived by the active use of opposing muscles, and this is what frequently happens. Such careless waste of power causes the arm to be much less sensitive to touch sensations." Ibid., p. 9.

[68]Kenneson, Cellist's Guide, p. 28.

of artificial equipment (the bow) from the area of consideration in order to understand its incorporation into the body's natural equipment (the right-hand gesture). In bowing, two problems are basic to the right-hand gesture: the bow hold and the path and change of bow-stroke direction.

All pedagogues share the aims of creating a flexible bow hold and a smooth arm motion for a correspondingly unimpeded flow of sound from the string. The widespread failure in achieving this aim (by students and teachers alike) stems from a misuse of certain aspects of the physical apparatus. In the bow-hold, the role of the thumb has been rarely appreciated.[69] When cellists overlook the simple fact that the bow rests on the strings of the cello, an unnecessary effort is made to support the entire weight of the stick by the "grip" of the hand. This grip then creates tension between the thumb and fingers and impedes the motion and leverage throughout the rest of the arm.[70] When the bow is correctly supported by the strings at one end and by the thumb at the other, there is no need to pinch or grip with the fingers. Furthermore, the flexion of the fingers should result only from the motion of the bow and not from a static bow-hold.

---

[69]Its significance in other respects has, however, been noted. Isaac Newton is said to have remarked that in the absence of any other proofs, the thumb alone would convince him of God's existence! See Walter Sorell, The Story of the Human Hand (New York: Bobbs-Merrill Co. Inc., 1967), p. 89.

[70]"In his Living Anatomy, Lockhart observes that if you press the fore-finger and the thumb together very gently the other fingers of the same hand are no longer freely mobile. The firmer the pressure, the stiffer the other fingers become. Simple testing of this phenomenon demonstrates how quickly the constraint reflexly evoked spreads to the wrist, elbow and shoulder." See Hellebrandt, "The Role of the Thumb in the New Approach," Strad, 80 (1970), p. 429.

> It is common knowledge that the firmly clenched fist is always bent backwards and that the fingers will loosen their grip and open as the wrist is forcibly bent forward...There is a tendency for the fingers (in the Havas bow-hold) to lighten their pressure on the stick at the end of an up-bow when the wrist is strongly flexed, and to increase their pressure perceptibly at the end of the down-bow when the wrist may be hyper-extended.[71]

It can be surmised that the "device" for flexibility in the hand is provided by using the thumb as a focal point for the player's tactile sensations with the stick. It is the right thumb which controls the progress of the bow motion. (For a further discussion of the thumb, see pages 51-55).

After the thumb supports the stick and the fingers have been allowed to fall on top of the stick, there needs to be a slight alternation of the plane of the hand into what can be called a "position of advantage." The hand must be slanted towards the tip of the bow. This slant is a result of rotating or turning the forearm inwardly (not of raising the elbow).[72] Some pedagogues use the image of the "ice cream scoop." This is simulated by the cupped right hand, the edge of which is favored during the scooping. With the bow stroke, it is an inside impulse directed outward, which required an "advantageous" contact of the fingers with the stick for bow control. In the change of bow direction, to completely relinquish this inclined hand plane, flipping the wrist and fingers would result in "alternations" which interfere with the continuity of a balanced

---

[71] Ibid., p. 427

[72] Dr. D.C. Dounis advocates the same approach: "Tilt the hand in the direction of the tip of the bow until a firm contact of the first fingers on the bow is established. This slanting position is the fundamental position for all bowings. It is your 'normal hold' from which all other hand positions on the bow are derived." See Valborg Leland, The Dounis Principles of Violin Playing (London: The Strad, 1949), p. 14.

arm resting through the fingers on the stick, hair, and string. Such altered finger and wrist activity is necessary neither for initiating the bow stroke nor for changing bow direction.[73] Any movement at all in the wrist and fingers need be minimal and merely a result of the movements of the upper arm and forearm during the course of the bow stroke.

Additional "Devices" for the Right-Hand Gesture:

(a) The Bowing Arc

Besides the bow-hold, there are several other "devices" involved in achieving a smooth bow-stroke unimpeded by changes of direction. These are the concept of the bowing arc and the verbal pulsing of the rhythmic duration of notes. Without the bow, the natural path taken by the opened and closed right arm is that of an arc. This arc cannot be "made"; it happens naturally.[74] When the path of the drawn bow describes a "straight line" as recommended by an unfortunately large number of pedagogic treatises, the player distorts a pattern natural to the arm's physiology. His movement will be artificial.[75] To change the bow direction correctly, one simply

---

[73] After reading the discussion of both right- and left-hand gestures in this essay, the cellist can understand how both forearms use a degree of pronation. A realization of their similarity helps to promote co-ordinated arm movements.

[74] In athletics, coaching methods are enhanced by an awareness of the body's own natural repertoire of movements as exemplified by the remarks of tennis instructor Timothy Gallwey: "I like to think that the same holds true for tennis strokes: that the perfect strokes are already within us waiting to be discovered, and that the role of the pro is to give nudging encouragement. One reason I like to think this is that when I and my students think of strokes as being discovered rather than manufactured, they seem to learn the game much faster and without frustration." See Gallwey, Inner Game, p. 65.

[75] "If one allows the bow to travel on a path where the suspended arm naturally takes it, the arc can be easily observed. One does not...

slides down the "lip of the arc" and in this way submits a self-controlled technical procedure to self-propelled activity.[76] The change of bow direction happens without conscious manipulation; cortical awareness of the bowing arc is regulated subcortically as an autonomous gesture. All movements of the bow must be accepted as parts of the basic stroke on the arc. Thus, the use of this device can generate a sensation of flow between all musical intervals on the same string and in the connection of two notes on different strings with both détaché, spiccato, and legato bowing.[77]

(b) Verbal Pulsing

The device of verbal pulsing is of such profound significance to some contemporary pedagogues that a thorough examination of the procedure is in order. At the outset of this chapter, reference was made to pedagogical innovations that strove toward the understanding of tone

---

...create the bowing arc...When an angular movement is made with the bow, the movement either tends to wither and stop at the ends of the stroke, or it may be abrupt, even violent, and go against the nature of the rhythmic flow of the musical ideas. Without the use of the bowing arc, isolated movements of the hands and fingers are needed to change the direction of the bow strokes." See Kenneson, Cellist's Guide, p. 31.

[76]"The motivation for the appearance and early development of bowing sprang from the appreciation by the peoples of the Near East and Central Asia, in medieval times, of continuity of sound. Contemporary Arab scholars imply that the pleasure of listening to vocal music was by no means unalloyed, since the melodic line was constantly interrupted by pauses for breath. The remedy was clearly to design musical instruments which could join the notes together and provide a continuous melodic line. This demand was met by musica automata, to which many Arab sources refer, by bagpipe, by organ, and by the various types of bowed instruments." See Werner Bachmann, The Origins of Bowing, trans. by Norma Deane (New York: Oxford University Press, 1969), p. 137.

[77]"It is important to realize that the contradiction in the very terminology of the strokes such as 'down-stroke' and 'up-stroke' can cause considerable subconscious conflict. To many players a down-stroke means just that: a downward pull of the bow from the fingers and wrist --and an upward push also from the fingers and wrist for the up-stroke --when in reality the curvature of the stick in the down-stroke is an...

production as a uniting of physical and psychological processes. In the bowing of open strings, the student can begin to incorporate this aim of tone production by means of the verbal pulsing device. A fact not sufficiently understood by students is that musical tones provide the medium for the experience of Time. Every other sensation is that of a thing in "space."[78] And while every other sensation possesses duration, with the exception of music, duration itself is not an element of the sensation.[79] In music, the effect of time passing through tone consists of its metric and rhythmic demarcation by the auditor. It has been demonstrated in the psychological laboratory that there exists a natural tendency to organize the time flux and this not into a linear succession of equal parts but rather into groups of duple or triple patterns.[80] These metric units are actually recurring cycles; in duple meters, beat number one and beat number two give the corresponding feeling of "away from--back to." Since in time we never actually return but move to a further moment in time, this cycle is better visualized as a wave. In a musical phrase, rhythm arises from the different arrangements of tones

---

...upward sweep towards the tip; while in the up-stroke the curvature is a downward sweep towards the nut." See Havas, Stage Fright, p. 37.

[78]"I do not grasp simply hardness but a stone, I do not see simply red but a tile roof, do not hear a whistle but the whistle of a locomotive; and in a tone that I sense preponderantly as noise, I hear above all the piano or the violin. But when I hear music I hear tones, not sounding strings or states to something; the tone is self-sufficient." See Victor Zuckerkandl, Sound and Symbol, Music and the External World (Princeton: Princeton University Press, 1969), p. 251.

[79]"The pressure of the weight in my hand lasts while I hold it; the green of the meadow lasts while I see it ... I do not see duration in the green; I do not touch duration in the heaviness. But I hear duration in the tone." Ibid, p. 253.

[80]For an interesting discussion of this human trait, see ibid., p. 166.

on the metric wave. Each tone has its own unique "kinetic impulse" depending on its metric context. However, in bowing long sustained notes (as in scale practice), or in the particular case of playing open strings, cellists have a common tendency to regard the activity as a series of "bow strokes"; there is usually absent any adequate device for organizing the duration of the tone. The French pedagogue Paul Bazelaire offers the following guidance in this area:

> The true sign of mastery is to establish a tempo and to fix upon a central movement. We have three means of establishing the solidity of the central movement: (1) to beat time in the text by means of solfeggio; (2) to practice with a metronome; (3) to train the left foot.[!][81]

The mechnical succession of beats or taps of the foot is devoid of metric waves or pulses and is only theoretically connected with the physical gesture of the bow arm. Such procedures fail when the only mental image of the tone to be played is a mathematical one.[82]

A more musical device for integrating physical and psychological activity is the verbally and physically pulsed duration of a note. The motive force for bow displacement must be a genuine "musical image"; it must be "ideokinetic."[83]

---

[81]Paul Bazelaire, Scientific Instruction in the Violoncello, trans. by H. de Constant (Paris:Durand; Philadelphia: Elkan-Vogel, 1960), p. 51.

[82]Mr. Bazelaire's "synthetic" approach as regards foot tapping is akin to a phenomenon in the medical profession characterized by the joke: "the analysis was perfect but the patient committed suicide" or "the operation was a success but the patient died!"

[83]It has been demonstrated how the physical aspects of playing are not directly amenable to volitional control. "Ideokinetics" is a process in which a mental concept or "musical image" programs a resultant physical motion. In the case of the pianist for example, "It is through the realization that his hands are acting under the influence of some...

> The singing of the note name acts as a triggering device for the gesture. In this way the speed of the bow movement will become an integral part of the total gesture that evolves from a musical idea...When the cellist catches the rhythm of the music in his mind, the physical gestures move with that same rhythm, using it as an organizing device. In this way the bowing gesture becomes rhythmically unified with the musical concept which sets the end-result goal.[84]

For learning, the verbal pulsing should be overt and might consist in dividing a whole tone into four monosyllabic vocal sounds. This will correspond exactly to subdivisions of the bowing gesture during its passage across the string.

When the cellist incorporates into his bow-stroke the three devices of right-thumb guidance, bowing arc, and verbal pulsing notes, an amazing transformation in tone quality is possible.[85] In such a stroke,

---

...other guidance that he must consider them self-less. It is the surest way of neatly cutting any possible tie linking them to his physio-volition; i.e., the surest way to realize complete physic-release." See Luigi Bonpensiere, New Pathways to Piano Technique (New York: Philosophical Library, 1953), p. 12.

[84] Kenneson, Cellist's Guide, p. 37.

[85] "Good instruments consequently allow of a much more powerful motion of the string, and the whole intensity of their tone can be communicated to the air without diminution, whereas the friction caused by any imperfection in the elasticity of the wood destroys part of the motion. Much of the advantages of old violins may, however, also depend upon their age, and especially their long use, both of which cannot but act favorably on the elasticity of the wood. But the art of bowing is evidently the most important condition of all. How delicately this must be cultivated to obtain certainty in producing a very perfect quality of tone and its different varieties, cannot be more clearly demonstrated than by observation of vibrational figures. It is also well known that great players can bring out full tones from even indifferent instruments." See Hermann Ludwig Ferdinand von Helmholtz, On the Sensation of Tone as a Psysiological Basis for the Theory of Music (New York: Dover Publications, 1954), p. 86. This is a reprint of the 2nd English ed., which is a translation of the 4th ed., 1877.

overtones are produced much more freely. The so-called "nervous system" of the cello (the relation of string, bridge, bass bar, and sound-post) will behave differently. Friction of the bow hair with the strings is achieved not by isolated pressure from the fingers but by the natural weight of the arm. And a rhythmically pulsed "psychological gesture" throughout the course of the bow-stroke creates an "ideokinetic process" in which there is physical movement but no computation nor awareness of transmitted effort. The beautiful timbre of the cello will be realized if the cellist "lets it happen" through the approach discussed.[86]

The Left-Hand Gesture

With the right-hand gestures the point has been made that "during performance the mind must be totally occupied with musical images, and the technique must be held in the service of those musical ideas."[87] It was shown how, with the light suspended arm and the free mobility of the joints, physical control of tone production could become a sub-conscious activity effecting the free vibration of the open string. It is when the cellist begins to use the left hand in fingering notes that physical blockages can inhibit artistic development.[88] The greater

---

[86]"The distinguished pedagogue Hans Hess relates that "Old German masters would say 'Aber das kommt mit der Zeit' ('That will come with time') but this is no longer valid. Tone is the first thing, the element of most vital importance! Get it first--and then keep it by you always while you are acquiring other values." See Martens, Mastery, p. 253.

[87]Kenneson, Cellist's Guide, p. 56.

[88]"It is with the touch, with the actual contact between left finger-tips and the string, that the question of life and death to the quality of sound arises. It is here that the difference between the ideas of strength or balance, cause and effect, become so overwhelmingly evident." See Havas, Stage Fright, p. 28.

tendency for tension to occur in the left hand than in the right is due to its responsibilities in the total musical process; the intervallic structure of string music necessitates the primary activity of finger technique in the left-hand gesture. Here there is a smaller radius of motion than in the right-hand gesture, and as a consequence that tension is less easily dispelled. However, proper intonation on the cello is not achieved by the fretting of the fingerboard; the tactile response of the finger is essential for accurately intoned musical expression. Obviously, rigidity and tension in the muscle are the enemies of muscular sensitivity. A pedagogic approach must be formulated which will promote a release rather than an accumulation of energy in the left-hand gesture. Only then will the possibility of left-hand development be insured.

There is among cellists a common misconception about the actual use of the left hand, about its purpose in the music-making process. As a result, the left hand functions poorly, and all solutions fail when the very formulation of the problem is wrong. This phenomenon can be itemized and contrasted with new approaches to cello pedagogy.

It is commonly believed that the left-hand gesture consists in the singular activity of depressing the strings with the various fingers. In contrast:

> Kato Havas had adopted the view that the subtlety of one's tone production depends greatly on the ability to conduct bow strokes from the left hand, where duration and pitch are decided--where the musical ideas are "acted out." If the bowing responds spontaneously to the left hand action, the musical ideas conceived in one's mind can become physical realities.[89]

---

[89] Kenneson, Cellist's Guide, p. 39. This view is supported by the scientific investigations of Szende and Nemessuri. "Faults of various degrees develop in tone production since effective co-ordination in

Moreover, methods of orthodox training encourage visual observation and direction of the finger-tip/string relationship. This only promotes conscious cortical direction of an act which ought to be subcortically regulated.

> The left-hand gestures...culminate in a tactile experience that sends back information endlessly to the nervous system, which is constantly modulating movement. The body becomes the transmitter of music, and the tactile awareness allows sensory feedback to constantly organize the automatic machinery of the living body.[90]

There exists a false notion that the immediate area of finger-tip/string contact is responsible for and controls the musical results. According to this notion, the strengthening of the fingers themselves is sought; the fingertip is crushed into the string from above, and the thumb responds to this downward pressure with upward pressure of its own.[91] The otherwise natural oscillating vibrato movements become artifically generated in order to "lubricate" this unnatural grip. On the contrary, the area of control for the fingertips must lie elsewhere. "Contact between the fingertip and the string is only the <u>effect</u> of the movement

---

...violin playing requires a certain degree of bilateral isolation and a definite sequence of movements. The basic direction of the motion sequence for stopping is: (1) left hand (2) right hand. The periods of left- and right-hand movements need not coincide; an asynchronism is necessary." See <u>Violin Playing</u>, p. 143.

[90]Kenneson, <u>Cellist's Guide</u>, p. 41.

[91]Such pressure would tend to interfere with the finger's own receptive apparatus. "In one square centimetre of our skin an average of about 2 [nerve] endings are found for warmth, 13 for cold, 25 for touch and 200 for pain. Tactile corpuscles are most frequent on the fingertips (100 per sq. mm.) in the palm and sole." See Szende and Nemessuri, <u>Violin Playing</u>, p. 137.

which is caused by the base joints"[92] (the large knuckles in the hand). It is from this large joint in each finger, far removed from the tip itself, that the brain controls the movements of the fingers. Weight in the finger-tip is achieved not by pressing into the fingerboard but by hanging from it. This permits any localized tension in the hand which might accumulate to radiate and dispel itself throughout the entire arm.[93] The suspended and balanced left arm serves to promote this irradiation.

> When the player removes the potential for pressing down-ward on the fingertips by dropping the knuckles below the fingertips and "hanging" the fingers onto the fingerboard, it is possible to control the weight of the finger on the string from an area removed from the point of contact. This removes any desire for excessive weight on the string after the fingertip has arrived in contact.[94]

Another misleading idea is that an exact point must be directly struck for correct intonation by the finger; this physical accuracy is cultivated through finger drills. However, expressive playing can only result from a "searching" finger action which is not unalterably committed by percussion and pressure to a fixed spot.[95]

---

[92]Kato Havas, A New Approach to Violin Playing (London: Bosworth and Co., Ltd., 1970), p. 29.

[93]"It can be demonstrated that not merely the muscles of fingers and arm are thrown into action in violin playing, but owing to the diffusion of excitation distant muscles also increase their tension. The irradiation of excitation...may become, however, increasingly restricted by training and by increasing perfection of muscular function in general. Less and less of such muscle fibres that have no direct part in the execution of the specified movement are excited and excitation concentrates on the muscles participating in the motor act itself." See Szende and Nemessuri, Violin Playing, p. 126.

[94]Kenneson, Cellist's Guide, p. 43.

[95]"On all stringed instrument, Intonation, in its purest form, is all the result of the finger seeking and finding the heart of a note because of an intense desire to produce it." See Maurice Eisenberg, Cello Playing Today, with a Foreword by Pablo Casals, 2nd ed. (London: Lavender Publications, 1957), p. 74.

Localized pressing of this type interferes with minute adjustments necessary to expressive intonation. It stiffens the hand and blocks the transmission of energy which should flow easily through the limbs and joints.[96,97]

Two "Devices" in the Left-Hand Gesture:

(a) The Left Thumb

In reference to the bow hold, it was observed that the right thumb becomes an active guiding force while the fingers assume flexion appropriate to the motion of the bow and wrist. The thumb on the left hand fulfills the opposite role, becoming subordinate to the finger gestures which are acting out the musical interval.[98] It was demonstrated how pressing the fingers from above encourages a reaction of contracting the thumb from below, and how by hanging the fingers onto the fingerboard the thumb is freed from this response. In effect, the thumb and fingers must become disassociated with the thumb functioning "as it were, primitively." This comment requires further explanation. Doctors Halverson and Gesell state:

> The anatomist reminds us that the skeleton of the hand is amazingly like that of the ancient tortoise

---

[96] Kenneson, Cellist's Guide, p. 43.

[97] "There can really be no more than an approximation of the location of the point of contact on the fingerboard. The player must 'search' for the note's quality. The contact between fingertip and string must be pliant. The inner musical voice programs the act of the body, and the spontaneous gestures transform the musical concepts into sounds. The final expression of these gestures is the pliant touch of the fingertip." Ibid., p. 43.

[98] This is of course not the case in thumb position when the thumb is used as a fifth finger.

> who for millions of years swam the seas and walked the earth before the advent of man. The human hand remains a strangely and almost shockingly primitive survival...In all apes this function (grasping) is characteristic of the foot; in man of the hand alone.[99]

The hand itself with its fingers and thumb is an evolutionary feature:

> The grasping reflex per se has a prenatal origin extending into relatively early fetal life. A newborn babe can suspend its weight in mid-air by the strength of its reflex grasping. The existence of this curious phenomenon has been known for nearly a hundred years. It is thought to be the vestige of some primordal aboreal function. It disappears a few months after birth, about the time signs of voluntary prehension make their appearance. The fingers become individuated out of the primitive undifferentiated hand when the thumb is still relatively inactive.[100]

During this evolution in the newborn, after the fingers acquire volitional powers of grasp, the thumb pivots to a position in opposition to the fingers.[101] The radius of motion in the thumb joint (much like the wing of a humming bird) permits opposition to each of the fingers.

In the cortex, the thumb and indeed the hand as a whole, are provided with a comparatively large area of excitable brain tissue in

---

[99]Arnold Gesell and Henry Halverson, "The development of thumb opposition in the human hand," The Pedagogical Seminary and Journal of Genetic Psychology, 48 (June, 1936), p. 340.

[100]Hellebrandt, "The Thumb," Strad, p. 423.

[101]"The course of development of the functioning thumb in grasping is from simple adduction, in which the digit parallels the metacarpals of the forefinger, to opposition in which the thumb pivots the other fingers." See Halverson, "The development of thumb opposition," p. 359.

relation to the rest of the body. (See Figure 6).[102] However, in the left-hand gesture for cello playing, the utility as provided by the thumb in relation to the fingers is not needed. This "prehensive ability" of the thumb must be discouraged by positioning the left hand and arm in such a way as to insure an independent and free action of the fingers. Similar to their action in the bow hand, the fingers can be encouraged to flex if the wrist is permitted to hyperextend backwards to some degree in relation to the rest of the arm. This flexion however, does not entail the involvement of the thumb which can remain disassociated from the rest of the hand. Dr. Hellebrandt sums up the device of the left thumb as follows:

> The hand may possess marvelously sensitive powers, but the ability to grip objects by thumb and finger opposition is not a function conducive to violin playing. Indeed, it must not be allowed to occur either in the bowing arm or the left hand. Opposition may subserve the needs of exquisitely precise manipulation, but the violinist does not, or should not manipulate his instrument. The right hand carries the stick in a variety of ways while the arm moves the bow across the strings. The bow operates as an extension of the arm. The fingers of the left hand stop the strings over the length

---

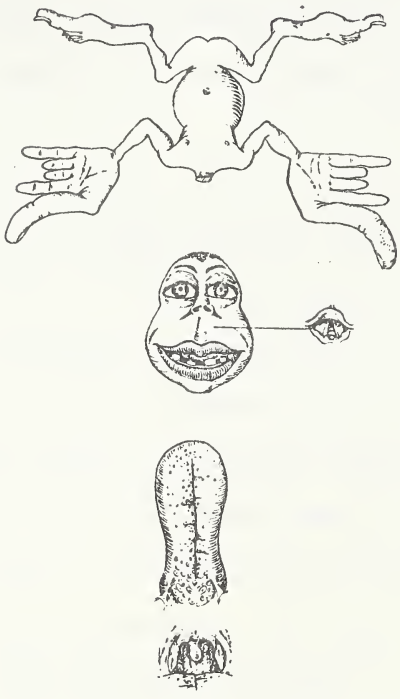
[102] "Even though 'all thumbs' is proverbially synonymous with awkwardness, the human thumb is the most highly prized member of the entire hand. Its special status is well reflected in provisions of workmen's compensation acts such as the Connecticut Statute (5237 Revision 1930). This statute, having specified the compensation for disability, adds provision for additional compensation at a given rate; its terms of weeks are as follows:

Loss of arm	255 weeks
Loss of hand	175 weeks
Loss of thumb	60 weeks
Loss of forefinger	38 weeks
Loss of middle finger	30 weeks
Loss of fourth finger	25 weeks
Loss of fifth finger	20 weeks"

Ibid., p. 340.

Figure 6:

Sensory and Motor Homunculus[103]



Sensory and motor homunclus. This was prepared as a visualization of order and comparative size of the parts of the body as they appear from above down the Rolandic cortex. The larynx represents vocalisation, the pharynx swallowing. The comparatively large size of thumb, lips and tongue indicate that these members occupy comparatively long vertical segments of the Rolandic cortex as shown by measurements in individual cases. Sensation in genitalia and rectum lie above and posterior to the lower extremity but are not figured.

---

[103]Wilder, Oenfield, and Edwin Boldrey, "Somatic Motor and Sensory Representation in the Cerebral Cortex of Man as Studied by Electrical Stimulation," Brain, 60 (December, 1937), p. 432.

> of the fingerboard. But the violin is an extension of the body, and the body [is] a subcortically controlled instrument of expression.[104]

The thumb is thus used merely to provide each playing finger with a reference for balance. In the process of tone production, the thumb's role is that of a useful ally in the finger's search for pitch.

(b) Naming the Note: Musical Image-Making

The device for singing the note name serves as a psychological cue for the triggering of the physical thrust of the finger. Thus, these are actually two interlocking devices; one is a cortically directed cue, and the other is an automatic response to this cue. The process may be termed "idiokinetic" because the physical response to the psychological cue does not require conscious guidance and control. The responsive movement of the fingers is subcortically controlled from their base joints throughout the duration of the note. The musical termination of the pitch will trigger the release of the finger. This procedure is used for every note in the interval chain.

> The physical action is put out of cycle with the musical event when the new note of an interval receives no impulse. The bow cannot respond automatically to a left-hand pitch that has no impulse. The pinning down of inactive fingers in the left-hand gesture (instead of giving them vitality and movement) causes the player to push and pull the bow consciously to activate the music. The explicit focal attention of the mind must be in the direction of the music, not on the manipulation

---

[104] Hellebrandt, "The Thumb," Strad, p. 429.

of the bow stroke.[105, 106]

The cellist can begin to understand the importance of singing and pulsing the note as a device when the mind of the player has been freed from controlling cortically all other aspects of playing. The balanced co-ordinated use of the musculature promotes its autonomous functioning so that the mind can be totally occupied with musical images.[107]

The phenomenon called "musical image" might at first strike one as a contradiction in terms: how can a vision be heard or a sound be seen? The term is encountered frequently in descriptions of sound and thus seems to be an acceptable way of symbolizing an attribute in total musical process. Yet the mere labeling of an experience does not explain it. Terminology provides intellectual knowledge alone;

---

[105] Kenneson, Cellist's Guide, p. 58.

[106] Kenneson has mentioned the fatigue and anxiety which can be generated by the finger's varied actions of thrust-release, string crossings, and stretches. In his view the solution to such co-ordination problems must be sought in the unity of the musical ideas. "One does not perform physically what has already happened, or what is about to happen, but only what is happening." See Kenneson, Cellist's Guide, p. 56. Furthermore "in the literature of teaching methods several authors have dealt with this problem (Foeckert 1909; Klingler 1921; E. Eberhardt 1922; Trendelenburg 1925; Mostras 1947) and referred to the following cases as being disorders of bilateral co-ordination: (1) increasing bow pressure induces a rise in the fingering pressure of the left hand and vice versa; (2) during change of position the movement of the right hand is also accelerated because of the rapidity of left-arm movement; (3) increased left-hand activity in performing fast passages includes tension in the joints and muscles of the right hand." See Szende and Nemessuri, Violin Playing, p. 143.

[107] "We learn fast whatever is self-evidently useful and subject to direction. Co-ordinated action plus observation seems to carry with it a memory function, as shown by the ability of children to add skills to accomplishments at a great rate." See M. Adeney, "Cello Teaching as a Process of Initiation," Strad, 80 (1969), p. 321.

understanding a phenomenon requires in addition knowledge experienced emotionally and physically. For the cellist to direct his mind to the formulation of "musical images," a further elucidation of this activity is required.

In his discussion of tone as the image of time, Zuckerkandl points out that forming images and thinking are two gifts that distinguish human existence from animal existence.[108] He then states that this world of symbols was a world of spatial images until the advent of a certain level of musical art which enriched this image world by the new dimension of Time.[109] Thus visual images represent material shapes of and in space while aural images represent the immaterial, durational shapes of Time. Both these images can have an existence exclusive to the mind through an act of imagination; all sense impressions can be conjured up mentally with remembrance of past or anticipation (precognition) of future experience. These images can also be delimited, making them more or less

---

[108]"Images conquer strangeness; create the first intimacy between man and his surroundings, material and immaterial. Images support and orient; forming images and contemplating images, man reaches out beyond himself, broadens that self, enters into most intimate communication with the world, lays hold of the world, and gains power over it. It is images that create and preserve the tradition handed from generation to generation; it is community of images more than community of thought that binds and delimits human societies." See Zuckerkandl, Sound and Symbol, p. 259.

[109]"In music of earlier times, tones were not free; they were bound to words, as in song, or to actions that call for regular bodily movement, as in dance, work, ceremonial. Thus the world of things, the spatial world, forced itself into the tonal world, mingled with it, and was able to prevent an insight into the very essence of music. It was not until tones freed themselves from these ties, and entirely dependent upon themselves, became a language out of their own content, that music wholly found itself..." Ibid., p. 260.

perceptible through a medium of lines and color, words, and notational devices. However, musical images will differ in quality from visual ones simply because they are derived from and represent a different order of phenomena; the magnitude of music exceeds measurement by the three co-ordinates of space due to its extension by motion through time.[110] But the fact that music is not known by the eye in space does not exclude the possibility of a representational image of sound through a different organ--the ear.[111]

Contemporary string pedagogy must concern itself to a considerable extent with cultivating the mental activity of musical image-making.[112] Many problems in performance can be traced back to either the misdirection or the general lack of this attribute in the musical process. It initiates all physical movement. In her book Stage Fright, Kato Havas attributes the fear of not being loud enough to a problem of

---

[110]For a fascinating exposition of the "motion of tone," see Helmholtz, Sensations, pp. 250-254. "But the motion of tone surpasses all motion of corporeal masses in the delicacy and ease with which it can receive and imitate the most varied descriptions of expression. Hence it arrogates to itself by right the representation of states of which the other arts can only indirectly touch by shewing the situations which caused the emotion, or by giving the resulting words, acts, or outward appearance of the body." Ibid., p. 251

[111]"As shaped and organized time, as a time image, the tonal work stands before the auditor's perception, offers itself to his view. If it has nothing spatial about it, nothing material in the usual sense, nothing objective, nothing for the eye, this does not prove that it is not an image, but only that viewing, beholding, is not the sole privilege of the eye." See Zuckerkandl, Sound and Symbol, p. 259.

[112]This language of imagery must be used by both pupil and teacher. Its efficacy is germane to every field of pedagogy. For example, with regard to tennis instruction, "I was beginning to learn what all good pros and students of tennis must learn: that images are better than words, showing better than telling, too much instruction worse than none, and that conscious trying often produces negative results." See Gallwey, Inner Game, p. 19.

aural perception on the one hand and aural conception on the other. She makes a distinction between "hearing" and "listening." In the former, the player can only hear pitch and his general sound quality.[113] In the latter, he cannot afford to listen retrospectively to the full acoustical impression of his own sound. The acuteness of pitch perception depends on a properly balanced touch that is both sensitive and free in its responses.[114] In this way, intonation and tone production become one and the same thing. "...if ear training is part of our daily practicing then the demand for overtones in every note becomes a co-ordinated aural and physical reaction--without any time lapse between hearing and doing..."[115]

However, even after solving the problem of hearing and reacting to pitch spontaneously, the cellist may still wish to listen to the quality of his sound to experience the otherwise indefinite acoustical impression being made upon the audience. He obviously cannot hear through another person's ear. Furthermore, he cannot as a performer listen retrospectively to his own sound without interrupting his attention to pitch in the present moment of intonation. Therefore, the method for

---

[113]"Few players in my experience realize that we cannot in fact hear ourselves as others hear us. We can hear pitch and we can hear sound, but we cannot hear what we sound like. That would be a physical impossibility." See Havas, Stage Fright, p. 72.

[114]"...if there is any rigidity in the body whatsoever, the true value of what we can hear is gone by the time we hear it because as we know only too well, rigidity also prevents spontaneous reaction in our sensory perception...the nature of sound is fluid, mobile, and always momentary. It is like time. One cannot hold it back for inspection, not even for a fraction of a second." Ibid., p. 72.

[115]Ibid.

knowing the characteristic qualities his sound projects is to listen in advance of the sound prospectively. To his perception through hearing is added his conception or preconception through listening.[116]

In musical performance, precognition is achieved through the use of the "inner ear" which is closely linked with the imagination.[117] Miss Havas states:

> The sensitivity of our inner ear like the physical aspects of playing, depends on a regular, systematic training. It goes together with the co-ordinated aural and physical reaction to the pitch. But while the overtones in the pitch provide a shiny warm sound, the inner ear supplies the sound with a meaning and color of infinite variety...It is the imagination transformed into music.[118]

It would be outside the scope of this paper to formulate a pedagogical approach to the training of the inner ear. Much data is available on the psychological activities of the audience and of those of the composer, and attention has been paid recently to the physiology of the performer. The bulk of research on the members in the musical triumvirate of composer-performer-audience has been carried out by musicologists, aestheticians, psychologists, and scientists. But this knowledge pertains to the reactions to sound by the listener after

---

[116]"...this kind of listening is always done a step ahead of the actual playing. It is always anticipatory. The inner ear has no time to listen to the player, and no desire to do so. It is far too busy conjuring up and transposing all the information it has absorbed into active imagination of the music in hand." Ibid., p. 77.

[117]"Everybody who is not deaf can hear, but it takes a musician to use the inner ear. It is the same with seeing. Everybody who is not blind can see, but it takes an artist to perceive the meaning of lines, shapes and colors in the most ordinary objects around him." Ibid., p. 76.

[118]Ibid.

intonation. Also, there is available some speculation and discussion of the mental processes of the composer pertaining to his "inspiration" and "poetic tonal images."[119] Very little is known, however, about the precognition required of the performer. Scientists are only beginning to acknowledge through their own investigations and verification the extent to which such psychic phenomena, traditionally relegated to the occult arts, are very much an active ingredient in every day life.[120]

In concluding this discussion of recent pedagogical concerns, it must be said that only through the excercise of the inner ear in the forming of "musical images" will the underlying purpose of all art--communication--be achieved. In the words of Miss Havas:

> The more the player learns to summon the imagination of the inner ear, the more he is able to forget about the extraneous part of his playing, such as his technique, his tone, the impressions he makes on his listener, etc., until eventually he can forget about himself. And that is when real communication begins. For with the elimination of the self he is able to reach the very core of the music and through the interplay of co-ordinated balances is free to transmit it to the audience.[121]

---

[119]Paul Hindemith speaks at length on the "musical vision" required by the creator: "...if we cannot, in the flash of a single moment, see a composition in its absolute entirety, with every pertinent detail in its proper place, we are not genuine creators...In writing melodies or harmonic progressions we do not have to select them arbitrarily, but merely fulfill what the conceived totality demands." See A Composer's World (Cambridge, Mass.: Harvard University Press, 1969), p. 71.

[120]It is primarily in the Eastern European countries that such research is being avidly pursued. There, discoveries are being made on a broad scale; everything from the enigma of the homing ability of various birds, insects, and animals to prophecy, telepathy, and the force fields of pyramids has come under intensive government-sponsored investigation. For a survey of this activity, see Sheila Ostrander and Lynn Schroeder, Psychic Discoveries Behind the Iron Curtain (New York: Bantam Books, 1973).

[121]Havas, Stage Fright, p. 77.

CHAPTER III

THE PEDAGOGICAL APPLICATION OF POPPER'S ETUDES, OPUS 73

The Efficacy of Etudes for the Cello Student

As has been shown in the preceding chapter, Popper was not only a highly esteemed performer on the cello, but was also very active in his desire to communicate his musical experience through his own compositions --in the area both of art music and of pedagogic studies. It is in the latter area that a problem of major importance arises for the music student. In listening to another artist perform, or in studying a work of art, the student enjoys obvious benefits to his development by listening critically on the one hand and exercising his powers of emotional interpretation on the other. In a pedagogic study, however, the student must extract value by quite different methods. Fundamental to the pedagogic work is a "technical dialectic" in which the artist attempts to describe systematically and progressively the idiomatic characteristics of the instrument. With David Popper, pedagogics did not take the form of method books with verbal analysis of musical skills. The student is instead confronted with Popper's musical études in which the aforementioned "technical dialectic" is unfolded. The principles of cello playing are sytematically portrayed in the varied character of the different studies, and it is the elucidation of these principles which benefit the student. Thus the playing of these studies is not merely an emotionally interpretive event but rather an experience in which the reinforcement of clearly-defined attitudes is expected by the composer of the étude. Clearly, then, the problem inherent in the étude is to discover what these attitudes must be.

Before moving to a description of the contents and technical divisions of Popper's Highschool of Cello Playing, it will be useful to discuss further some of the problematical aspects in the pedagogy of string instruments. It is perhaps not generally known that musical études themselves vary in their efficacy to a considerable degree. When used properly, some études can greatly improve the intellectual, emotional, and physical faculties of the player, while other studies, worked upon with equal diligence can cause considerable harm to the player's talents. The problem here stems essentially from a fallacious assumption shared to varying degrees by many pedagogues. This assumption was based upon a false idea of the student's volitional powers; an improper method of problem solving had been postulated. Only in the light of physiological findings of the twentieth-century is this misconception being corrected.

In 1970, the distinguished biological scientist F. A. Hellebrandt, reported that "It is not yet known exactly how voluntary movements are engendered, where the executive orders come from, nor why they lose their mantle of awareness as a result of learning."[122] Traditionally, in writing a pedagogic study, the composer attempts to induce a particular idiomatic principle through the repetition of various notational patterns. Reasoning thus, some pedagogues have concluded that an increase in the repetition of these patterns will increase the degree of volitional control by the executant. A large body of pedagogical works in this style has been conceived and prescribed with this end in view. But with new scientific knowledge, we are now able to demonstrate the

---

[122]Paul Roland, String Instruction, p. 166.

inefficacious nature of these methods. Dr. Hellebrandt continues:

> What is identified by the clever and observant teacher is not necessarily what is amenable to conscious control. If translated into a directive, the pupil may or may not be able to accomplish the objective by exercise of the will. Man does not learn naturally along efferent lines --that is, by trying to direct consciously what happens automatically in part or in whole.[123]

In the case of the étude, the composer assumes the role of the teacher. We can conclude therefore, that études which are excessively repetitive in nature tend actually to inhibit the growth of a natural process--that is, that effortless co-ordinated playing can never result from the unnecessary prolongation and emphasis of cortical control. "Musical performance" will never be born in this manner.

The efficacy of études can be demonstrated in yet another way. The noted European pedagogue Percival Hodgson stated:

> Most of the difficulties encountered by pupils are actually created by methods and schools which cause players to hand on descriptions bearing little if any resemblance to the motions made by themselves.[124]

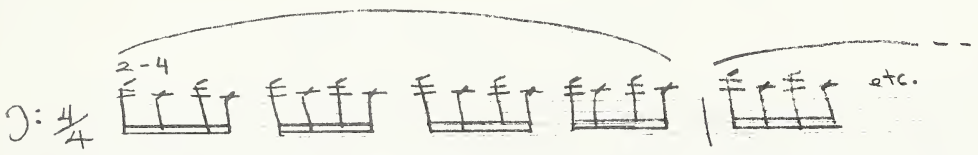
These difficulties were a result of a common phenomenon in human behavior noted by the distinguished investigator of kinesthetics, F. M. Alexander and termed "end-gaining." Through "end-gaining" some composers of études perpetuated false or at least misleading notational descriptions of physiological processes. End-gaining consists primarily of an undue regard for the achievement of a result without sufficient examination of what Alexander called the "means whereby" one obtained this result. Immediate, unintelligent gratification was discouraged. "Don't you see that if you get perfection today, you will be farther away from

---

[123] Ibid., p. 168.

[124] See Motion Study, p. ix.

perfection than you have ever been?"[125] The velocity studies by Paul Bazelaire (1886-1958) represent a perfect example of notational descriptions that demand an end-gaining physiological process. In the particular study examined, the action of string crossing must be exercised in a merely gymnastic manner. A short extract will demonstrate the inefficacious nature of this study:



Example 1. Bazelaire, Velocity Studies[126]

There is absent any notational preparation of the second finger preceding the string crossing and of the fourth finger following the crossing. Such an étude fails to cultivate any understanding of physiological processes. It deals with effects, not causes. In promoting a reform in our kinesthetic awareness, Alexander states:

> The problem before us is to find a means whereby a reliable sensory appreciation can be developed and maintained throughout the organism, and the basis for my argument is that both in education and in re-education this must be brought about in every case by the reliance of the individual, not upon subconscious but upon conscious reasoning guidance and control.[127]

---

[125] F. M. Alexander, The Resurrection of the Body (New York: Dell Publishing Co., Inc., 1971), p. 10.

[126] Paul Bazelaire, La Technique du Violoncello (Paris: A. Leduc, 1936-44), Vol. IV. Douze Etudes De Velocité, No. 6.

[127] Alexander, Resurrection, p. 13.

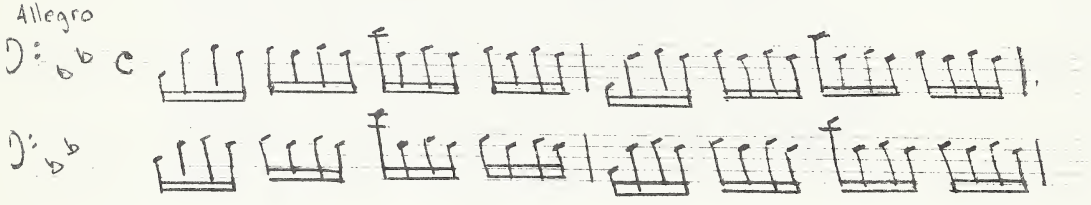
In contradistinction to the Bazelaire study, an example from Popper's Opus 73 shows a more musical and pedagogically useful cultivation of the principles in string crossing:

Example 2. Popper, Etude No. 1

In Example 2, the cellist is given a much better opportunity for discovering a "means-whereby" the string crossing is achieved. The alternation of fingers before and after the interval of string crossing provides a device to guide and control the necessary "thrust and release" of all left-hand gestures. A further discussion of this aspect will be found on pages 79 - 82.

Another aspect of études which determines their pedagogic value is the degree to which idiomatic procedures of technique are integrated into a broader musical context. The Bazelaire example shows some of the inherent problems which arise when such considerations are neglected. Older pedagogues considered that the effect of a particular technique could be caused exclusively by the functioning of the finger muscle involved. The exercise of a particular muscle, it was assumed, would produce the desired acoustical effect. The error in this approach lies in a failure to recognize the connection between visible and invisible apparati of the physiology, between known and unknown centers of control. The approach is musically deficient in that it fails to incorporate isolated pitches into significant melodic movement. The emotional dynamics of musical intervals and harmonic relationships experienced in

the ear were thus subordinated to a technical procedure experienced in the fingers. In short, the musical imagination of the executant of such études was not stimulated; his physical apparatus was exercised only in a segmented manner. Good examples of this type of étude can be found in some of the studies by Friedrich Dotzauer (1783-1860) as shown in the following:



Example 3. Dotzauer, 113 Studies, No. 71[128]

In 1971, a collaboration between violin pedagogues and scientists resulted in The Physiology of Violin Playing, in which the authors Szende and Nemessuri state:

> We intend to answer the question whether the most subtle and isolated finger movements, i. e. those performed by the individual fingers separately, were due merely to the function of finger muscles, or whether the movements executed by the finger muscles necessitated an intricate co-ordination of the muscles also in the shoulder girdle and in the whole arm.[129]

Today some pedagogues are re-examining the whole approach to tone production in an effort to unite both the physical and the psychological processes. In her book A New Approach to Violin Playing, Kato Havas states:

---

[128]Friedrich Dotzauer, 113 Studies for Cello Solo, ed. by Klingenberg (New York City: International Music Company), p. 71.

[129]See Violin Playing, p. 37.

> It is not a question of teaching and imposing a certain dogma, but of making it possible for the student to "let it happen." From the very first lesson the student is trained how to differentiate between causes and effects. The New Approach, through the compelling logic of certain basic play actions, is based on the idea of balance, not of strength. There are no "mechanical" finger exercises as we understand them. The aim of the exercises is not a strengthening process but an elimination through finding the exact balance, of all conscious muscular action save one, so that the mind can be freed from the impossible task of concentrating on two or more things at once. Then if this one conscious muscular action is properly developed, it is able to transmit and control the musical and artistic impulses of the player to such an extent that all mechanical problems disappear and there is nothing left for him to do but to give full vent to his imagination.[130]

Further, Kenneson says that:

> The cellist must have an organized effort in order to set his musical goals and give direction to the practice. It is of critical importance that this organization is directed at the appropriate aspect of the sequence of events. First comes the clarity of the musical idea and the setting of the end result goals...certain "problems" will simply solve themselves when the cellist becomes convinced that he will not sacrifice his ideational capacities by allowing the mind to direct consciously what the body is prepared to do automatically.[131]

Investigations of this nature are beginning to shed light on the true dynamics of musical performance. Fortunately, however, many of the traditional etudes are suitable for the elucidation of these modern approaches. For instance, David Popper's studies reflect what might be deemed an intuitive awareness of these more dynamic pedagogic attitudes.

---

[130] Havas, A New Approach, p. 2.

[131] See Cellist's Guide, p. 88.

The Intervallic Structure in Cello Music and the Technical Categories of Popper's Opus 73

Let us move now to an examination of the contents of Popper's Opus 73. Two of the typical considerations by cello students are the difficulty and the duration of an étude. Furthermore, the player's attention is directed toward defining the particular technical skill delineated in the music. Since, however, a composer rarely annotates his études verbally, the pedagogic thrust of the work is not always clear, especially when several idiomatic procedures are included in a single study. The potential of any particular étude will only be fully realized if both the teacher and the student have a perspective of all the categorical possibilities for cello technique. Furthermore, they must have an awareness of the musical characteristic common to all bowed instruments which pervades every étude and establishes the dynamic aspect of performance. The student's use of études will then cease to be motivated by a desire for mastery and endurance of something difficult. In his study of études, his achievement will not be the result of a finite process. The playing of études will stem from a more fundamental activity of making music, which is an infinite process.

In discussing the characteristic common to all bowed instruments and which generates all other technical procedures, Kenneson states: "The very nature of the cello and its characteristic music establishes the task of our technique. Our most usual technical concern is the performance of a single line, a progression of musical intervals.[132]

---

[132] Ibid., p. 89.

As we have seen from Chapter I, the very advent of bowing in the evolution of stringed instruments was not merely "the invention of new species or varieties of instruments, but an opening up of new regions of musical expression."[133] It was the emotive quality of the human voice which was idealized with the invention of the bow.[134]

Once the intervallic structure in musical expression is pedagogically defined in terms of the psychological and physical activity appropriate to it, all other idioms of cello technique can be understood and integrated. In this regard Kenneson states:

> By dealing always with the interval unit, the player will allow no segmented part of the musical architecture to go unnoticed. The physical gestures are constantly negotiating the movement of the basic components of the musical structure. The finger action will be exactly related to the musical image held in the mind...It will be seen that the act of finger preparation with its duality of thrust and release can be transformed and expanded in endless variation to include shifting, double stops , string crossing and all the details of technique so often considered as segmented particulars in the orthodox training of cellists.[135]

Typical of the German school of pedagogy, Popper's Highschool of Cello Playing emphasizes the training of the left hand. This training can be categorized into four main types of which there are further

---

[133]Bachman, Bowing, p. 136.

[134]"Whereas in Medieval times other instruments were restricted to single notes or series of notes--the wind instruments by their natural harmonic series or the distance between their holes, the harps by the tuning of their strings and the lutes by the spacing of their frets--bowing allowed the player to produce slides and slurs, as well as every conceivable intermediate note within the natural compass of the instrument. He was thus able to follow the vocal line in all its melodic intricacies." Ibid., p. 137.

[135]Kenneson, Cellist's Guide, p. 59.

subdivisions (see the following table). This emphasis on the left hand is important for the implementation of contemporary pedagogical principles. In studying Table 1, the pedagogic thrust of the forty etudes is seen to consist of:

(I) string crossing;

(II) double-stops;

(III) thumb position; and

(IV) shifting.

There is a fifth category for specific left- and right-hand devices such as mordents or staccato notes respectively, and also for studies developing speed and endurance. One étude in this category is an orchestral study. All of the études are "modified" by the type of bowing required. The physical gesture is more complex for the unslurred than for slurred intervals and for intervals requiring a string crossing.

Further subdivisions of each category consists of:

(a) string crossings with or without intervening shift;

(b) double stops of thirds and their inversions primarily without the thumb;

(c) thumb position using fixed or moveable positions or a combination of both; and

(d) shifting on the same, consecutive, nonconsecutive, or replacement finger.

After having discussed the basic musical feature in string playing, that is, the intervallic structure, and after having examined the left-hand categories of technique in Popper's Opus 73, it is possible to implement this knowledge into the performance process through annotations of selected études.

TABLE I

POPPER'S ETUDES CATEGORIZED ACCORDING
TO PEDAGOGIC EMPHASIS

TYPE I: Orchestral	TYPE II: String Crossing	TYPE III: Shifting	TYPE IV: Double Stops	TYPE V: Thumb Position
Features	Features	Features	Features	Features
a) speed b) endurance c) left-hand d) right-hand	a) slurred b) unslurred	a) same finger b) consecutive c) non-consecutive d) replacement	a) thirds b) sixths c) sixths & thirds	a) fixed b) movable
No. 5 (b) No. 6 (a) No. 14 (d) No. 19 (Lohengrin) No. 22 (c) No. 26 (b) No. 27 (c,d) No. 29 (c) No. 32 (d) No. 36 (d) No. 37 (c) No. 38 (c)	No. 1 (b) No. 2 (b) No. 10 (a)	No. 2 (a,b,c) No. 3 (a,b,c) No. 7 (a,b,c) No. 16 (a,b,c) No. 15 (c) No. 21 (a,b,c,d) No. 23 (a,b,c,d) No. 30 (a,b,c) No. 31 (a,b,c) No. 35 (b,c)	No. 9 (c) No. 17 (b) No. 29 (c) No. 34 (b)	No. 4 (a) No. 8 (a) No. 12 (a) No. 13 (b) No. 18 (a) No. 20 (a,b) No. 28 (a & shifting) No. 30 (?) No. 33 (b) No. 35 (b) No. 38 (b) No. 39 (a,b)

ETUDES BY NUMBER: Type Categories

No. 1-II	No. 11-II	No. 21-III	No. 31-III
No. 2-III	No. 12-V	No. 22-I	No. 32-I
No. 3-III	No. 13-V	No. 23-III	No. 33-V
No. 4-V	No. 14-I	No. 24-III	No. 34-III
No. 5-I	No. 15-III	No. 25-I	No. 35-V
No. 6-I	No. 16-III	No. 26-I	No. 36-V
No. 7-III	No. 17-IV	No. 27-I	No. 37-V
No. 8-V	No. 18-V	No. 28-V	No. 38-V
No. 9-IV	No. 19-I	No. 29-I	No. 39-V
No. 10-III	No. 20-V	No. 30-V	No. 40-I

Pedagogic Annotations of Selected Etudes

The annotations of selected études will be based upon the pedagogical approach outlined in the previous chapter. Because of their left-hand emphasis, these études are particularly amenable to a pedagogy which conceives the left-hand gesture as directing that of the right.[136] The method of annotation will consist of selecting several works from each category of left-hand technique (See Table I) and analyzing characteristic sections from each work. By working selectively, it is possible to reinforce in the player those specific pedagogical devices with which to realize the entire work. M. B. Stanfield recommends just such an approach for the pupil in order to avoid the monotony of working through every passage in a single étude over a period of days, weeks, and even months. She does not advise memorizing or studying an entire étude, but rather to practice a few lines per day from two or three separate studies. By studying several cellistic idioms simultaneously, the student saves time and avoids muscular and mental fatigue.

Miss Stanfield testifies to the value of Popper's Opus 73 when she says:

> Many will find it helpful here to study certain works by the great nineteenth century master cellist David Popper. Famous alike as an executant and a teacher, he is considered historically as the father of modern cello playing and the forerunner

---

[136] "The theory that the left-hand should be regarded as the dominant partner of the cello is now accepted by most experts alike by reason of its close association with the notation, its importance in matters of tactual intonation, the fingers' powers of articulation and because vibrato provides the most direct means of introducing color and nuance." See M.B. Stanfield, "Technique Building for Cellists, No. 8", Strad, 80, (1969), p. 79.

> of Casals. The four volumes of his "Highschool" études offer proof of his status and in some ways his gifts to posterity are still more evident in his virtuoso pieces.[137]

The études in many cases lend themselves to public performance. This is due to the unusual attention Popper gave to a harmonic orientation of the various interval chains. Interesting piano accompaniments to fill out the texture and enrich the timbre are quite easily conceivable.[138] While this is far removed from the genre of the "concert étude," Popper's style still points in that direction.

(a) Type 1: Orchestral

Etude number six is conceived to develop speed and endurance.

Example 4. Etude No. 6

The player will find that speed and endurance enter his realm of possibility only when the mind and body is co-ordinated. While there are shifts, string crossings, some thumb position and détaché bowing techniques required of the player in this étude, the emphasis of the composition is to develop the left-hand device of "thrust and release" finger action. This of course will require using the device of note-naming. Especially in fast playing, it is essential to have a central

---

[137] Stanfield, "Technique Building for Cellists, No. 5", Strad, 79, (1969), p. 475.

[138] See David Popper, Four Studies, for violoncello with added piano accompaniment by Deszo Kordy, (London: Novello and Co. Ltd., n.d.).

point of control to co-ordinate the mind and body. This control lies in the mental identification of each note consecutively. Only with information about each note can the finger action become a response (to something other than a muscle stimulus); only after a responsive left-hand contraction can the right-hand become a response (to something other than the muscles of the shoulder girdle). Thus, it is the psychological activity of note-naming which cues the physical apparatus.[139] The process of note identification can be implemented as follows: (1) the note names of the excerpt are spoken aloud (this trains the eyes to notational information); (2) the same note names are sung without rhythm (this trains the ear to notational information); (3) the rhythmic pulse is added to the same sung and named notes.[140]

After identification, the left-hand finger action can be incorporated. This is done away from the cello. In a fourth step in the above sequence, the appropriate finger action is added to the other three steps. Best results are obtainable by miming the position of the left arm and hand on the cello and bringing each finger called for into the

---

[139] In actuality, the mind and body manifest simultaneously. Kenneson defines both a tendency to the contrary and a solution for the cellist: "TENDENCY: To combine involuntary reflexive movements with consciously directed bow movements, alternating the attention between the left hand and the bow. SOLUTION: To give impulse to every note performed in the interval sequence through the left-hand gesture, and to allow the bow movement to react as a reflex to these impulses." See Kenneson, Cellist's Guide, p. 61.

[140] "Naturally when identification becomes a habit, one does not need to say the names of the notes aloud. They will be imbedded in the mind. And as the mind works faster than lightning, identification will be made at an incredible speed which eventually becomes the same natural process as the identification of people and objects around us (with all the subsidiary information around them)." See Havas, Stage Fright, p. 84.

palm of the hand. The thrust of one finger causes the release of the previous one which, in miming, moves in the opposite direction away from the palm. In the beginning, these movements are exaggerated for learning purposes. Obviously the faster the playing becomes, the more refined the finger movement becomes, until ultimately the released finger may even remain in contact with the fingerboard.[141]

After the left-hand has responded to the named note, the right-hand gesture can respond to the lead of the left side. In a fifth step of the above sequence, the motions of the right arm are then mimed in correspondence to the mimed left-hand finger action. The physical relationship between the left and right side of the body has been demonstrated by physiologists in the laboratory. Their work in rehabilitating paralyzed patients has shown that direct muscular exercise of one side of the body has an indirect yet perceptible effect toward improving the functioning of the other paralyzed side of the body. Thus, when he focusses on the left-hand gesture, the cellist is training his right side simultaneously.[142]

---

[141]The physical quality of the thrust and release gestures varies according to the nature of the music being played. When there is no time to actually disengage the fingertip from the string, the feeling of thrust and release is utilized. The contact between fingertip and string must be so pliant that the finger can pulse on demand while keeping its contact with the string...even if the tip of the finger is not physically released from the string. If it is otherwise, the cellist will find himself often falling onto dead notes in the interval chain." Kenneson, Cellist's Guide, p. 58.

[142]"Observations reviewed suggest that training affects more than the muscles subjected to direct practice and the equivalent group of the opposite side. The purpose of the study was to determine whether systematic exercises of the progressive resistant type administered to one muscle group has a measurable influence on the functional capacity of the related agonist-antagonist pairs of the same and the contralateral extremity." See F. A. Hellebrandt and Joan C. Waterland, "Indirect...

To implement the note-naming device with the given excerpt, it is best to work first in small groups just in the way a child learns to read--beginning with letters, words, sentences, phrases, paragraphs etc.[143] Thus, groups of four notes can be used, making a definite "stop" between each group to let the mind rest.

This should of course be done away from the instrument. One might proceed in this way through each phrase, going on to the next only after memorizing the previous one. In the previously discussed process of subjecting as much as possible to subcortical controls, the eyes happen to be one of the greatest obstacles. As soon as the visual stimulus from the printed page can be removed, the shift in cortical levels is assured. In this fashion, the player's typical question "Should I memorize?" is answered.[144]

In the training period, the importance of the stop cannot be over-emphasized. Usually in a mental activity like memorization, when one does well up to a certain point, one forges ahead riding on

---

...Learning--The Influence of Unimanual Exercise on Related Muscle Groups of the Same and Opposite Side," American Journal of Physical Medicine, 41 (April, 1962), p. 45.

[143] In the opening excerpt the phrases are demarcated by the descending melodic line at the beginnings of each measure: F-E-D-E.

[144] "Kinesthetic awareness...may be enhanced by closing the eyes. This curtails retinal stimulation and suppresses visual feedback and its attendent cortical associations. Thus attention may be narrowed to the barrage of sensory impulses flowing from tendons, muscles, and joints." See Hellebrandt, "The New Approach," p. 279.

the momentum of previous successes. The mind, however, must be allowed to rest, and by pushing ahead, inaccuracies and eventual breakdowns are sure to follow. By measure groupings of two or four bars, one programs a short stop or rest before proceeding, in order to insure the "regeneration" of the mind.

Finally, after the miming and memorization of the music at hand, the instrument is taken up, and the player will have the feeling of the cello "playing itself" once the mind and body have been pre-programed. The cellist will have succeeded both in "transcending" a cortically-controlled technique and in removing the tendency for excessively tensing the fingers by striking the hard surfaces of the cello.[145]

The ultimate significance of this pedagogic approach is that all physical movements evolve naturally because they have become integrated by the action of a focal point--the singing of the intervals by the inner musical voice through note-naming. "The tone production resulting from the integration of the actions of both sides [of the body] is quite different from that which results from a mechanical motivation in the bowing arm itself, which is cortically controlled and

---

[145]"Formerly the lifting and hitting of the fingers was done mechanically, like striking the hammers on a piano. Corks were often placed between the second and third fingers so that irrespective of any difficulties due to the physical construction of the hand, the distances from note to note would be acquired automatically. This practice led to a well-drilled, but inflexible hand instead of one in which sensitivity and elasticity are combined with strength." See Eisenberg, Cello Playing, p. 12.

does not evolve naturally."[146,147]

(b) Type II: String Crossing

The pedagogic thrust of the first etude is string crossing.

Example 5. Etude No. 1

In a study of this type, it is important for the bowing to be self-propelling.

It is advisable to establish the détaché arm motion first without the bow. For the pendulum-like weightless motion to be achieved, all excessive downward pressure must be removed. There must be no disturbance in the "flow of time" sensation. (One might try this miming in rhythmic groups of arm movements as in note-naming).[148]

After verifying the responsiveness of the right-hand gesture through miming the détaché stroke, attention may be directed to its connection to the left-hand gesture. Kenneson makes a very important distinction between bow rhythms which are "mechanical" and those which

---

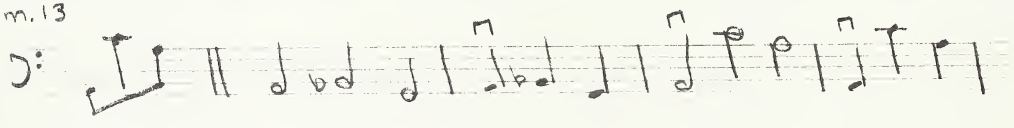
[146] Kenneson, Cellist's Guide, p. 64.

[147] Although he does not employ the actual device of miming the note names, finger, and bow gestures, Mr. Eisenberg believes in the value of "visualizing the phrases and moulding the hands." He states: "When practising, try to acquire the habit of visualizing every phrase as a whole and moulding the hand in advance to take in each group of notes. Concentrate on this while thinking through the cello part without playing, when first studying a work. Afterwards, when working out the passages on the instrument, continue to bear the hand moulding in mind, paying special attention to finger placing." See his example from Bach, Suite VI, prelude in Cello Playing, p. 75.

are musical![148] An expressive musical rhythm is one connected to the left-hand gesture;

> Musical rhythm exists when one sings a progression of intervals. Because the intervals are of varying sizes, i.e., the distance between their tonal points of reference varies, one feels that each interval takes its own time to exist [emphasis added]. The left hand can learn to sense this phenomenon if its gesture is transforming a musical image which is sung by the inner musical voice...if the bow alternates strokes with a mechanical precision, the bow rhythm will seldom coincide with the expressive rhythm of the interval progression.[149]

In the excerpt, the preparation of the thrust and release finger varies in degree depending on the direction of the string-crossing from low to high or high to low. In the first case, the practice procedure could be as follows:

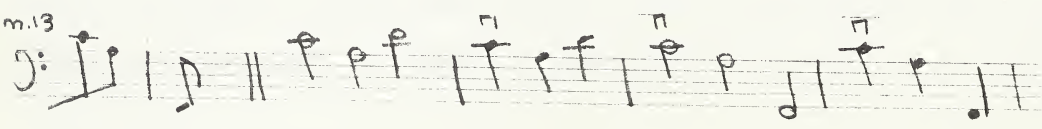


---

[148] Cellists may have had occasion to use the pedagogic manual of Mr. Arpad Szomoru. Essentially, the author's counsel consists of a program for artificial physical gesture. For example: "When pulling the bow (down-bow) the motion is initiated by the breast-muscle (shoulder), the whole arm-unit is moving to the right, with stretching out elbow. When pushing (up-bow), the arm-unit moves to the left, with bending elbow. Doing the same motion without a bow, the arm-unit will move horizontally [non-arc] the elbow, being a unidirectional joint, always horizontal, never pointing upwards or downwards." See Arpad Szomoru, Cello-Pedagogy: on becoming you (Florida: Performing Arts Institute, 1972), p. 39.

[149] Kenneson, Cellist's Guide, p. 62.

The finger motion does not occur on a line at right angles to the fingerboard. The path is oblique "from scroll to bridge." This "forward thrust" feeling must not be abandoned even though the interval A-C requires a sideways displacement of the second finger after the first. The above exercise is designed to reinforce the "forward thrust" feeling necessary to all left-hand gestures. The degree of preparation for this string crossing is less than that required from a higher to a lower string. This is because the knuckles are already positioned to the left of the fingerboard. Thus, the knuckles of the second finger are already near its target note C.

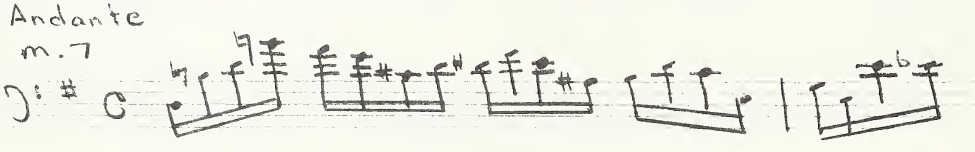
The next string-crossing is practiced in the following way:

The problem here is that preparation of the fourth finger is preceded by an open string. The second and fourth fingers are separated so that the rhythm of the thrust-release between consecutive fingers is interrupted. The solution is to instill the feeling of thrust to the open string note using the release of the previous second-fingered C.[150] Next, the size of the preparation for the fourth finger is large. The hand is moving from a higher to a lower string. This motion will involve a changing arm level to provide sufficient balance on the lower strings. The rest of the intervals should be practiced in this fashion.

---

[150] In miming the left-hand gestures, Miss Havas recommends fingering the open-string notes in the music with a gesture of the thumb. See Havas, Stage Fright, p. 88.

The bow must have a common programming with the left-hand gesture. The rotating right-arm motion required by a change of string level is of course motivated by the upper arm. The fact of more visible motion in the wrist and forearm during the crossing should not confuse one about cause and effect. These wider movements are the results of motions elsewhere--in the larger muscles of the upper arm and in the fingers of the left hand which in effect "beckon" the right arm to change string level.[151]

(c) Type III: Shifting

The second étude presents the cellist with problems of shifting. Of the four kinds of shifts shown in Table I, this study employs three: shifting with the same, consecutive, and non-consecutive finger.

Example 6. Etude No. 2

The significance of the extended ligature is not primarily for "bow control," although one must know how to conserve bow speed and still

---

[151]Earlier pedagogues, while sensing the need for flexibility in the left-hand fingers failed to communicate the desired effect because of an absence of the thrust-release device. For example, a more illusory formulation of this device by Mr. Eisenberg is stated thus: "In order to vocalize we need what might be termed 'a living hand'. This means it must be trained to be so vital and flexible that as soon as a finger strikes its note, the preparation for the following note begins. The new note should be approached through a continuous if almost imperceptible, intensification of movement." See Eisenberg, Cello Playing, p. 11.

maintain tone quality and volume. Actually however, Popper seems to encourage a focus on the left-hand shifting by simplifying the bow gestures required. In order therefore "to forget about" the right hand, it is deployed in a single gesture, playing all the notes of the measure under one bow.[152]

The most deceiving feature in shifting from one position to another is, again, the cause and effect of the hand motion. Earlier mention has been made of the propensity for accumulated tension in the left-hand gesture, due to the small radius of movements there. It is in the shift that the scope of motion approaches that of the right-hand gesture. Consequently, the player can expect the movement to include the motivating muscles of the upper arm. Obviously the hand cannot move without the fore-arm; the forearm, if moved without the upper arm would merely act like the rotating radius of a circle, swinging the hand out and away from the fingerboard. It can be concluded that the larger the shift is, the greater is the <u>forward</u> motion of the upper arm to guide

---

[152]In his study, Mr. Szomoru encourages the student to cultivate the opposite effect. He exemplifies with photos the "natural" pinched and collapsed thumb and second finger with the "four fingers supported by the bow"[!] Flexibility in such a grip is achieved by the insertion of surgical tubing between the stick and the rigid fingers. "The bow is held, pinched between these two opposite fingers (thumb and second). If we are pinching something between thumb and finger (nose, ear, a piece of paper) we do it automatically, naturally with a straight flat thumb and finger. So there is no reason to hold the bow with rounded thumb and finger as some old methods advocate...There is less muscular contraction if we pinch an object a few inches larger than a very thin one. Therefore, the use of rubber, plastic or leather tubing at the nut is highly recommended." See Szomoru, <u>Pedagogy</u>, p. 30. While rubber tubing at the frog is employed by some professional cellists, it is not to correct an otherwise "rigid grip" but rather to assist in weight distribution along the stick.

the rest of the arm keeping it on the "railroad tracks" of the string.[153]

When shifting, it is useful to know the range of notes playable in the new position. This range, called by some pedagogues the "village" underneath the hand, dictates an appropriate fingering depending on the fingerboard position. For example, only after the fourth position does the cellist conceive of villages which exclude use of the fourth finger.

In addition to the thrust-release gesture, the preparation for the note in the new position must also include a mental "form imprint" of the new village.[154] In the excerpt, the shift takes us from the first to the sixth position. The new "village" is B-A-G.

Example 10.

For every shift, the motion is controlled by a definite sequence of events. This sequence consists of:

> vivid conception of the interval; bold command triggering spontaneous movement; finger preparation with its thrust and release...When there is clarity of the ideational objective, the command is bold, and the triggering device works. If the ideational objective is vague, the

---

[153]This attitude concurs with that of Mr. Eisenberg. "The basic movement of the hand and arm going up and coming down the fingerboard very much resembles that of the right hand arm unit when pulling out and in on the whole bow. Ascending passages represent the down bows, those descending the up...similarity is provided by the ratio of movement in the joints, and the role played by the opening and closing of the elbow. Once again it is the forearm that usually has to cover most of the ground, although the upper arm should be in imperceptible use, in order to precent rigidity." See Cello Playing, p. 57.

[154]A finger pattern is found to fit the key of the music in the new position.

> command lacks definite direction. Command follows conceptualization.[155]

To implement the shifting information at this point, a procedure may be outlined as follows:

> step one: verbalize the note names: b-d-b-a-g
>
> step two: sing the same notes at pitch
>
> step three: mime the left-hand gestures appropriate to each note; alter the hand-shape after the shift to B has transpired.
>
> step four: add the appropriate rhythm, pulsing once on each note.
>
> step five: add the mimed bow gesture (a sustained arm motion).

When the instrument is taken up, one may simply "let it happen."

The student will not fail to experience a physical gesture of thrust from D to B appropriate to this interval, because he has first sung the interval, and his finger preparation is responding to a previous acoustical sensation. Being still uncommitted to the instrument at step three, he is not obliged to move off into the unchartered regions of a "black ebony forest." When each note is given its own pulse, "The judgement of how much time one needs to connect two widely separated points in sound [can] depend on musical values, not mechanical ones."[156]

As the cellist shifts the hand, it is obligatory to have an active ear both to preconceive the desired pitch and to spontaneously adjust physically to the goal of the inner ear (match-mismatch). Therefore the finger-tip/string contact must be extremely pliant. This

---

[155] Kenneson, Cellist's Guide, p. 75.

[156] Ibid.

pliancy will not be maintained when the shift is preceded by a sudden stiffening of hand muscles prior to the shift, and followed by excessive finger pressure upon arrival. For this reason, it is not useful to encourage contact with the string during the shift by fingers other than the two notes of the interval.[157] Kenneson maintains:

> The point of contact between the fingertip and the string must be very sensitive and pliant. The least amount of undue traction during the actual shift will frustrate the shifting movement. The player must poise his finger on the note which sounds first, pulse on the string, trigger the new note (sing its name) and shoot the finger forward to find its mark.[158]

Furthermore, even when playing within a position, contact with the string by more than the actual playing finger serves no useful purpose.[159] In faster passages, there is contact, but no pressure by non-playing fingers. Through the cultivation of fingers that are sensitive and pliant the player can begin to possess what Mr. Eisenberg terms "instinctive intonation." He states:

> Some players have a special flair for intonation.

---

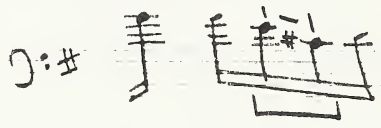
[157]The remarks of Louise Potter on this point are without foundation. "For most shifts, especially large interval shifts, it is easier and serves to reduce muscular tension, if as many fingers as practical are kept down during the slide. The fingers thus help each other in keeping the string pressed down." See The Art of Cello Playing (Illinois: Summy-Birchard, 1964), p. 115.

[158]Kenneson, Cellist's Guide, p. 76.

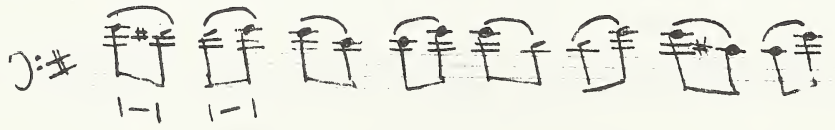
[159]"To keep the fingers lying in position cannot be recommended as a general principle of left hand technique. Stopping relies on the motor co-ordination of the respective fingers, and not a mechanical support obtained from other fingers. Finger fixation would but add to the muscular work that is already required to maintain the non-playing fingers above the string. It impedes the elastic joint motion of the fingers in and out of playing, and induces stiffening." See Szende and Nemessuri, Violin Playing, p. 62.

> Their aural faculties are extremely keen and their fingertips seem to posess an inner magnet that draws them instinctively towards the finest shadings that whole tones, half tones and even quarter tones can give. This applies particularly to the Hungarian Gypsy; without apparent effort they seem to find the "touch" that makes the extremities of their fingers act in perfect synchronization with each other in obedience to the dictates of the most discriminating ear.[160]

The next shift in the excerpt requires a definite pulse of the upper note, G.



The descent is always more problematical than the ascent. The initial forward thrust on G must be followed by a backward arm motion to the lower note C-sharp of the interval. This backward motion is interrupted by a forward thrust of the finger upon arrival.[161] The distance in this case (an augmented fourth) is comparatively large; thus, the directional change forward and back is more problematical. Practice may proceed thus:



When the cellist incorporates the above annotation into his practice, the interval of the shift and the necessary thrust and release is

---

[160] Eisenberg, Cello Playing, p. 76.

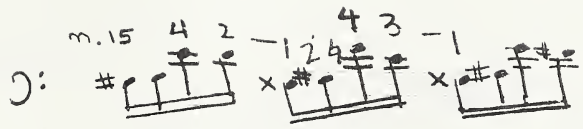
[161] "As in bowing it is usually easier to draw the arm out from the body than to return it to its original base with a well co-ordinated movement. Generally speaking, it is therefore more difficult to shift the left hand away from the bridge when descending, than to move towards it when ascending." Ibid., p. 57.

"progressively staged." The thrust will begin to be sensed as a rhythmic sliding off of one note through thrust-release and onto another. Through a rhythmic slide, the cellist achieves the mobility necessary to shifting.

In the next excerpt, the next shift of importance, C-E, requires the use of a non-consecutive finger:

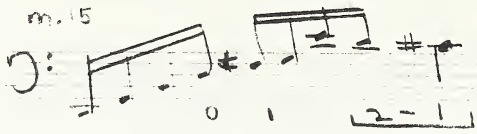
When confronted with the shift, the cellist must decide on which finger to slide. His decision stems from the desired character portrayal of the music at hand. For example, in a romantic style, the cellist might choose portamenti with an expressive glissando either of arrival or departure. In another style, he might use a cleaner, less expressive shift either by sliding on the same finger of the previous note and then dropping the new finger onto the subsequent note, or, by sliding initially on the finger to be used by the new note. These latter two types of shift are aided by a slight cessation of the movement of the bow during the slide to conceal the glissando. In the previous example, the player's choice is dictated by the musical fact that the note E acts as an upbeat to the following measure. Preparation for a downbeat requires a distinct rhythmic articulation on the upbeat. The E is therefore best obtained with the "drop-shift"; the slide commences with the fourth finger and ends by articulating the E with the first finger.

Another shift of importance in this etude requires a "finger replacement" of the same spot on the fingerboard by a new finger:



In the excerpt, this procedure is complicated by a simultaneous string crossing. A good preparatory exercise for finger replacement is as follows:

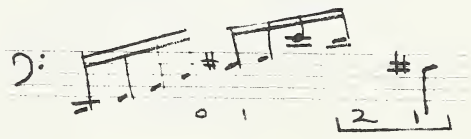
These may be done in any position and on any string. In their implementation, the cellist will obtain better results at a slow tempo, with two pulses on each note, slurring two notes per bow. This can then be reduced to one pulse per note. In practicing the excerpt, the cellist uses an annotation which incorporates the afore-mentioned progressively staged steps.

step one:

Exercise of the first finger required in the string-crossing on the same string.

step two:

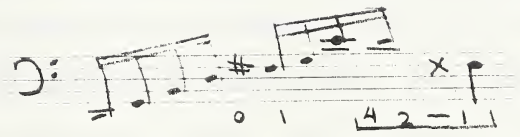
Exercise of the finger replacement on the same string.

step three:



Exercise of the string crossing by the forward thrust "angled off" to the D string, and landing on #F.

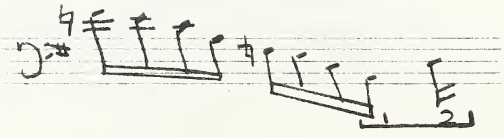
step four:

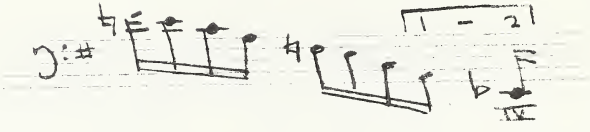


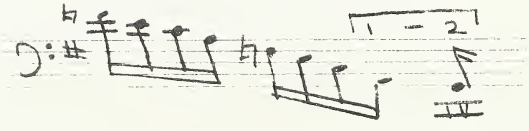
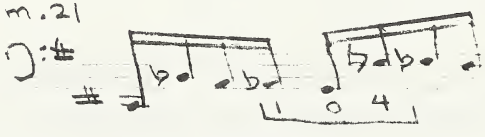
Combining the string-crossing gesture with the finger replacement gesture.

Other shifts from étude number two involving string crossings can be practiced in exactly the same way:

step one:

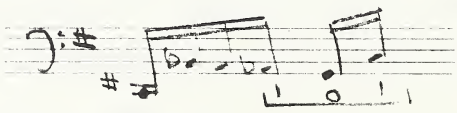
step two:

step three:



step four:

Another problematical shift in this étude is found in measure 21:

Example 7.

The solution to the problem of consecutive finger preparations separated by the open string has already been considered. Here the problem is more complex due to the shift following the open string. The thrust-release of the A-flat will pulse the open G pitch. At this point, the cellist is confronted with the question of how to "find" the E when no fingers are touching the string beforehand. The thrust of the fourth finger is not preceded directly by the release of another playing finger. The answer lies in the use of an "auxiliary note" through which and from which the required thrust can be guided. This auxiliary will be the pitch C played with the first finger establishing third position. The practicing may proceed as follows:

step one:

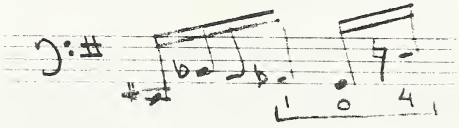


The auxiliary note is played.

step two:

The E is shifted to from the auxiliary note C.

step three:



The E is shifted to omitting the sound of the auxiliary note. It is convenient to consider the actual thrust as consisting of the interval of a major third, A-flat-C even though the musical image which

triggers this thrust is the major sixth, G-E-natural. Also, during the shift there is a device for guiding the hand in its ascending motion. Since the notes are played in a rapid tempo,sliding on the fourth finger into the E-natural would produce an audible glissando, especially with the passage slurred. The device employed in this case is to slide on the thumb from underneath the neck. In this way the E can be obtained quickly and accurately. Awareness of the auxiliary note provides a sensation of the required distance to be travelled by the fourth finger, while the thumb guides the fourth finger along its path.

To acquire further understanding of the techniques of string crossing and shifting, the student may include in daily practice the device of the "interval chain."[162] With this device, the cellist can exercise the cueing of thrust-release by note naming. He also becomes acquainted with the range of notes in any one position on the fingerboard.

> The cellist will remember that singing the note's name with the inner musical voice cues the beginning of the gesture, while pulsing the note rhythmically keeps the gesture operative throughout the duration of the tone. The study of interval chains utilizes this learning device. During this type of study the cellist may investigate a variety of interval combinations and their fingering possibilities. Playing interval chains is a progressively staged process that can be expanded to incorporate many aspects of [Miss Havas's] New Approach training.[163]

After training the ear and base-joints through intoning the successive notes of the interval chains, the cellist will have acquired the faculty needed for chordal intonation, or the simultaneous sounding

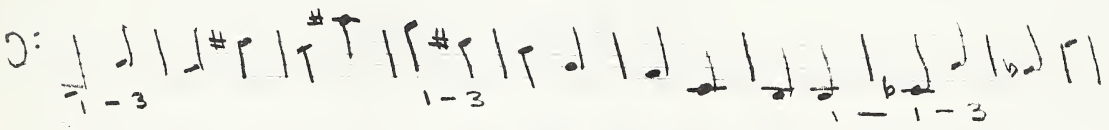
---

[162] For a fuller definition of the interval chain and its variations, see Kenneson, Cellist's Guide, pp. 79-87.

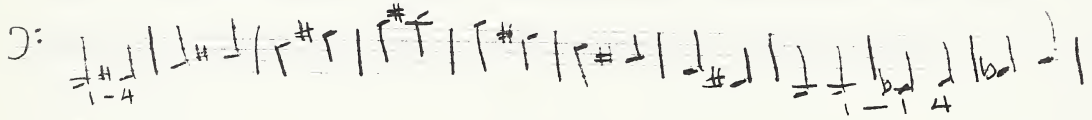
[163] Ibid., pp. 79-80.

of interval members. Briefly, some variant patterns of the chain consists of the following:

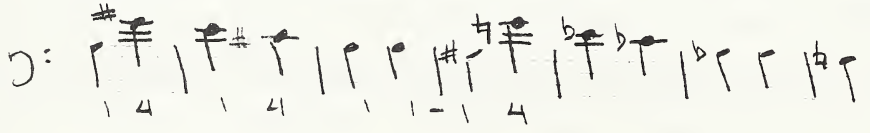
sixths and fourth:



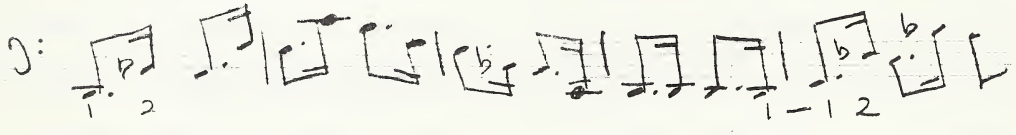
major thirds:



sevenths and thirds:



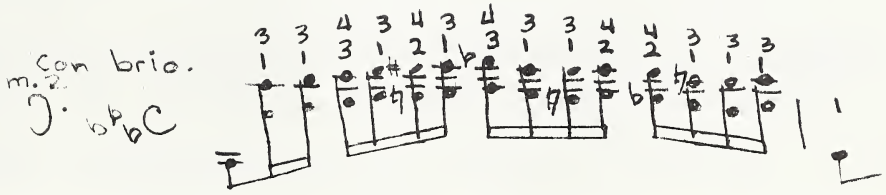
shifting in rhythm:



The interval chain should include the cultivation of both major and minor intervals with a variety of fingerings. Permutations of the chains are also useful, as for example the sequence major sixth (1-3), minor sixth (1-2), major sixth (1-3).

(d) Type IV: Double Stops

Etude number seventeen is a study in the third category--the development of chordal technique. It is taken up at a time when the interval chains have become thoroughly familiar. In playing double stops, the cellist must find a musical as well as a physical point of balance:



Example 8. Etude No. 17

The ear must have a focus. Without this, there would be continual duality in the random alternation of the higher and lower notes of the interval. Once an appropriate aural focus is established, the particular physical device in the left hand used to realize the aim of the ear can be elucidated.

Mention has been made of the true timbre of the cello consisting of the free sounding of its unique envelope of overtones. Obviously when two strings are activated with the bow, the free vibration of the strings is twice as important. For this reason, almost all the pedagogical treatises consulted concur in advising that the notes of the various chords be played first separately and only later combined. In this way, quality can be added to quality rather than starting with a dubious compound sound and trying to alter its indistinct ingredients. This procedure is to be encouraged. However, this approach still falls short; after each purely-intoned member of the chord has been combined, it is still difficult to hear accurately the ingredients of the chord. By analogy, a certain "tint" of the pure hue red producing pink contains varying quantities of white and red. The eye of the painter must be able to sense the degrees of redness and whiteness when formulating the red tint for pink. Whether our goal is a definite color, or an accurately-intoned and freely-vibrating chord, the pedagogue must be aware of certain problems in the aural training of the cellist.

The first problem in hearing chords is of a general nature.

The process of perception consists in the apprehension of a Gestalt entity. This phenomenon is appreciable if the auditor attempts to compare the difference between the following two sensations:

In the successive notes, two distinct pitches can be heard, while these same notes simultaneously intoned produce something different than merely two tone-sensations. The whole is greater than the sum of its parts.[164]

Gestalt psychologists depict all mental development as the identification of units, the parts of which then become more and more perceptible with increasing experience. In the playing of chords on a stringed instrument, the analysis of individual members of the interval is a destructive process from the Gestalt point of view.[165]

> To a sensitive musician a symphony is an indivisible Gestalt from which nothing could be omitted without the destruction of the unity. But often the attempt to discover by analysis the quality or the source of this apprehended unity is as futile as that of searching for the beauty by tearing off the petals of a rose.[166]

---

[164]Gestalt sensation, to be more precise, was actually present with even the single tone. "The earliest examples of this quality of knowing were drawn from musical experience. Christian von Ehrenfels, a German philosopher, pointed out in 1890 that though the ear could analyse a tonal clang into its fundamental tone and a number of upper partials, it was heard as a note of definite pitch, and that this, as heard, differed from the sum of its components." See James Mainwaring, "'Gestalt' Psychology," Grove's Dictionary of Music and Musicians. Edited by Eric Blom, 10 vols., 5th ed. (London: MacMillan Co., 1954-61), III, p. 611.

[165]"The chord, the conjunction become conscious of itself, is, then, not simply the sum of the individual tones as they sound together; it is something above and beyond that sum, something new as compared to the individual tones, something that radiates from their union, that hovers about them like an aura--inconceivable so long as only individual tones were known, indescribable in words." See Zuckerandl, Symbol, p. 107.

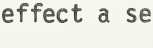
[166]Mainwaring, "'Gestalt' Psychology," p. 611.

Furthermore, the melodic and horizontal shaping of successive notes might have to be altered in the context of vertical tonal centers and vice versa. The Gestalt viewpoint also considers melody as inseparable from rhythm.[167]

On the one hand then, divisibility distorts the chord and on the other, its indivisibility makes the chord difficult to hear and intone appropriately. A reconciling force must be found between these two extremes.

Some of the problems in hearing chords are in the area of acoustics. Although a thorough discussion of the acoustical phenomenon would be outside the scope of this paper, several acoustical characteristics can be mentioned which contribute to the pupil's difficulty in diagnosing the ingredients of the chord. First there is the phenomenon of "beating." In the octave, there is an exact coincidence of the upper partial tones of both compounds (see Figure 7). However, when the tones in the octave are not precisely in the ratio of 2:1, there is an interference between the sound waves of the slightly differing upper partial frequencies. This is heard as a regular intensification of sound in "beats." Helmholtz determines the consonance or dissonance of an interval by the degree to which beating occurs. In the octave which is in

---

[167] Even rhythmic patterns are subject to contrary reflects as can be seen in La Rue's Principle of Reversibility. A pattern simulating an intensification of movement,  can, in a certain sonorous context effect a sensation of powerful cumulative drag:

See Jan La Rue, Guidelines for Style Analysis (New York: W.W. Norton & Company, Inc., 1970), p. 145 ff.

tune, there are no beats. The fifth is the next most consonant interval because there is a coincidence of at least two upper partial notes, while the rest will beat against each other. Also, as the order of intervals becomes smaller, as their ratio increases, the beating becomes less perceptible. For example, the major third (4:5) is less distinct to the ear in its delimitation than the major sixth (3:5).[168] Figure 7 classifies those intervals which are distinctly characterized and those which have their limits somewhat blurred by the weaker beats of the higher upper partials. The character of an interval, then, is experienced both in the unique pattern of beats generated by the conflicting overtone structure of each fundamental and in the presence or absence of beats between those upper partials of each fundamental which should coincide.[169] Of practical significance is the fact that the rendition of the interval in the chord is more or less difficult depending on the distinctness of beating.

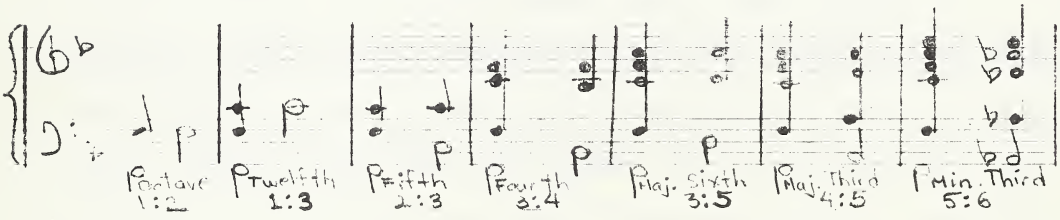
In the selected étude, number seventeen, the intervals of the major and minor sixth predominate. Although the minor sixth is more dissonant, with more beating per second, it will be easier to play in

---

[168]"In the same proportion that these higher upper partials become weaker, the less perceptible become the beats by which the imperfect are distinguished from the perfect intervals, and the error in tuning is shown. Hence the delimitation of those intervals which depend upon coincidences of the higher upper partials becomes continually more indistinct and indeterminate as the upper partials involved are higher in order." See Helmholtz, Sensations, p. 182.

[169]"When two such musical tones are sounded together, there will be not only the dissonances resulting from the higher upper partial tones in each individual compound, but also those which arise from a partial tone forming a dissonance with a partial tone of the other, and in this way there must be a certain increase in roughness." Ibid., p. 186.

Figure 7: Intervals and their Upper Partials[170]

The following examples in musical notation show the coincidence of the upper partials. The primes are as before represented by minims, and the upper partials by crotchets. The series of upper partials is continued up to the common tone ¶ only.

[170]Helmholtz, Sensations, p. 183.

tune than the major sixth due to its higher ratio (5:8) and hence the weaker volume of its beats.[171] The major sixth, on the other hand, will be more jarring to the ear (when out of tune) due to the more distinguishable beating which will occur.

There are two pedagogical devices to provide the ear with a focal point of balance in hearing chords. The first device consists of developing the ear's sensitivity to the "combination" or "resultant" tone which, in addition to the overtones, is produced when two loud tones are sounded simultaneously. There are several kinds, the loudest of which (and therefore the one of most practical value) is the differential or "Tartini tone." It is quite probable that a good majority of developing string students have never consciously listened for the Tartini tone in their playing of chords. But these tones are sounding to varying degrees whenever double stops are intoned. It is the "combination" or "Tartini tones," however, which provide the deep <u>resonance</u> of the cello. Hearing them for the first time can surely be an amazing experience. The following figure gives the frequencies of the various notes in musical cents:

---

[171] "It must be recollected that in the minor sixth the 2nd and 3rd partials form the semi-tone 15:16 and the 3rd and 5th form the semi-tone 24:25, and that the <u>resulting beats</u>, which in good qualities of tone are never absent, will always be more powerful than those which arise from small errors of intonation...[the out of phaseness of those upper partials which should coincide ".] <u>Ibid</u>., p. 194.

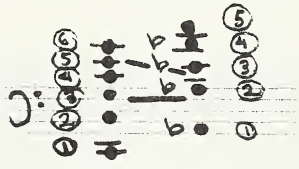
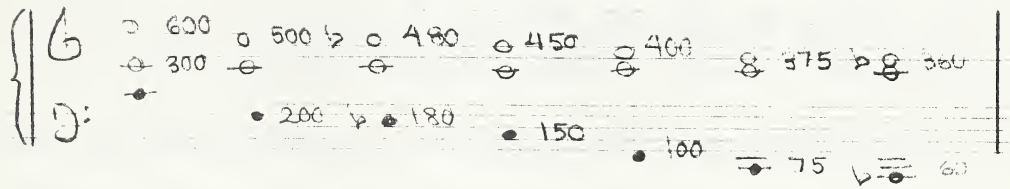


Figure 8:

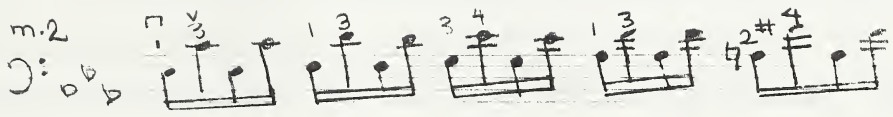


The cellist can finger all of these intervals on the D and A strings. The bowing should be sustained, and it may take several minutes of activating the strings and adjusting the fingers to produce an audible Tartini tone. One should sing with the inner ear the "third" tone desired, trying to focus the ear on the possibility of that tone in the sound complex. With patience, the player can "conjure up" the low buzzing of the third tone. On some instruments, the player will obtain immediate results with the intervals of the fourth and the minor sixth.

In the étude under consideration, Tartini tones are inaudible in intervals below middle C. Therefore, the device is useful in those étude passages which exceed middle C in range. (See annotations to Popper's octave study number thirteen under types V and VI, page 105-107 for further application of this device).

The second device for providing focal attention for the ear consists of arpeggiating each interval with the bow "trill-style." The cellist is thereby able to hear the individual notes in addition to hearing the overlapping resonance as a chord.[172] Practice of the selected excerpt may follow this procedure:

---

[172]This procedure is very common in keyboard pedagogy for the training of aural acuity through voicing and articulation of chordal passages.

This rhythm can be reduced, as the player breaks each interval once instead of twice. Then the interval should be played unarpeggiated only with differing durational pulses per interval.

There now remains to be found a pedagogical device to provide the left hand with a physical point of balance in the actual playing of chords. The hand must be trained to faithfully realize the aim of the ear. This is achieved when one uses the stronger lower-numbered finger in each interval as the control device. The tendency to grab with the hand in the playing of double stops is removed when the cellist feels the weight in his fingers coming from a hand and arm which are dropped below the level of the finger-tip.

> When taking the notes of the double stops separately during practice, the lowered-numbered finger in every case should be the mobile point of balance. When the shape and positioning of the hand is a result of finding the balance of this lowered-numbered finger, then one simply drops the other finger into place. This avoids the urge to stretch the fingers apart and place them separately.[173]

In the excerpt, the required shifting is best controlled when only the larger-numbered finger receives the thrust-release gesture. While the smaller-numbered finger participates in the rhythm of the shift, mental focus is on the balancing larger-numbered finger.[174]

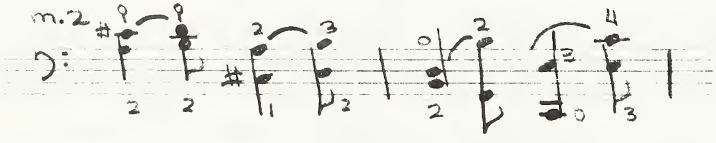
---

[173] Kenneson, Cellist's Guide, p. 78.

[174] On this point Mr. Szomoru provides the cellist with pedagogically unsound counsel. "In the lower positions the intonation is based on the fourth finger. It functions as the extension of the arm-unit, determining the distance of the shifts." See Szomoru, Cello Pedagogy, p. 53.

A problem occurs in playing double stops when a chord on one set of strings is followed by a chord on another set of strings. This is especially problematical when there is a shift in hand position. The jerk of the hand into the new position often interfered with the smooth entry of the bow on the new chord, causing it to jump also from one string level to another. For example:

The same problem occurs many times in étude number thirty-four:



Example 9.

As a solution, Maurice Eisenberg offers this approach:

> Just before the shift, the lower note of the third [this refers to our example of ascending thirds] should be released both by the bow and the fourth finger without disturbing the tone on the upper note. This will enable the bow to be prepared for playing on the higher string and give the hand a chance to be ready to move back quickly...[from its previous position].[175]

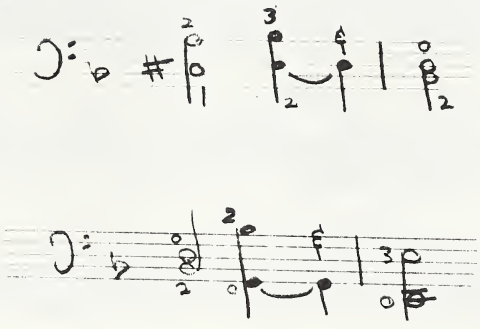
The reverse procedure is advised in the playing of descending intervals with string-crossings.[176] This approach may be applied in the excerpt

---

[175]Eisenberg, Cello Playing, p. 99.

[176]"Descending, it is the upper string that should be released first. When the higher note is an open string the first finger should be taken up and placed close to the second in preparation for the coming shift. Meanwhile the fourth finger should be raised above the string, ready to come down on its note on the lower string. Naturally the angle of the bow has to be adjusted immediately the higher string is released, before the change of position." Ibid., p. 99.

given as follows:



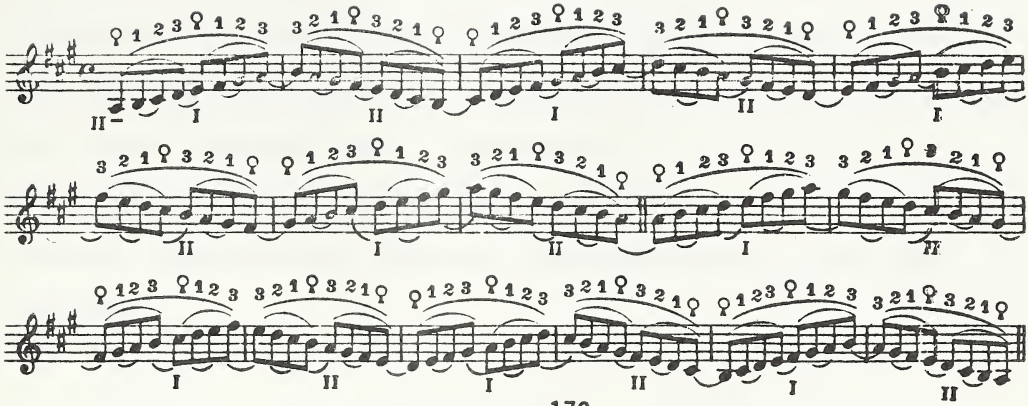
(e) Type V: Thumb Position

There remains to be discussed those études which employ the use of the thumb in the role of a playing finger. These are studies using the thumb position.[177] In Mr. Eisenberg's treatment of thumb position, the only real point of divergence from the "physical balances" previously elucidated in this essay for left-hand techniques is in his "push-bearing down on the thumb note." When he states that "if the elbow is held slightly above the level of the hand it enables the player to utilize a push-bearing down on to the thumb notes,"[178] he encourages an unbalanced position of the arm. Such a position definitely interferes with the feeling of thrust-release and of the sliding balance necessary at all times in the arm and hand gesture.

An excellent exercise for note-naming, with the appropriate alterations in hand shape, is the miming of Eisenberg's drill for "movable thumb." This is to be done away from the cello.

---

[177]The reader should refer himself to the excellent treatment of this subject in Chapter IV of Eisenberg's book.

[178]Ibid., p. 55.

Example 10[179]

Many cello treatises encourage the practicing of fifth and octave thumb-position studies as a first step in acquiring this skill. This approach is overly taxing to an undeveloped hand however, and should only follow thumb-position exercises of a scalar and arpeggiated style. With this approach, the cellist can better search for the sense of balance without gripping or pressing from above. In thumb position, the relationship of the base-joint to finger-tip is not the same as it is in the lower positions. Therefore, to remove the tendency for excessive weight from above, the base-joints should not be allowed to approach the level of the finger-tips.[180] The thrust and release of each finger is still toward the bridge as before and not down and into the string as a right-angled string-finger relationship would encourage.

An excellent Popper étude for the scalar use of the thumb in

---

[179] Eisenberg, Cello Playing, p. 58.

[180] "When one uses the thumb positions is it no longer possible to drop the knuckles lower than the fingertips and a different relationship is established which removes the leverage that invites a direct downward pressure on the fingerboard. One hoists the knuckle above and behind the finger-tip, leaning the knuckle slightly toward the scroll." See Kenneson, Cellist's Guide, p. 44.

alteration with another finger is étude thirty-eight. This is a suitable étude for development of the thumb as a fifth finger because it does not involve prolonged strain, interrupted as it is here by use of the third finger. In shifting, the cellist can practise the thrust-release gesture to deal with the problem of accumulated tension in the upper positions.

Example 11. Etude No. 38

Each physical gesture is of course pre-programed by the working of the inner ear. Only in this way can the study transcend the level of mere physical exercise.[181]

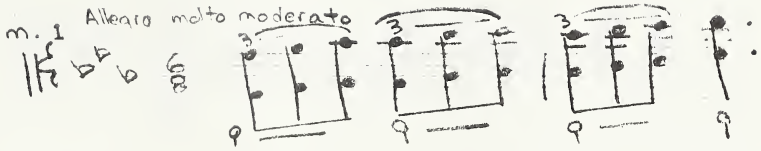
(f) Type V and VI: Double Stops and Thumb Position

Having established the hand shape for the octave in a musical way through physical gestures corresponding to an aural image, the cellist may take up Popper's octave study number thirteen.[182]

---

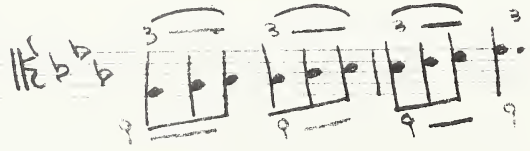
[181]Unfortunately the regulation of higher centers by lower ones is more often the pedagogic norm, as can be witnessed in the following account: "In difficult passage work, after the pupil has become acquainted with the composition, I allow him to play in a rapid tempo, without criticizing his intonation until he has obtained the proper finger endurance and flexibility. Then I have him work out perfect intonation and roundness in detail, and the result is usually excellent[!]. If the intonation be corrected before the other obstacles have been overcome, the student will never play the technical passages fluently in the proper tempo." W. B. Ebamn quoted in Martens, Mastery, p. 240.

[182]Cellists should be well acquainted with the treatise of Alfredo Pais, La Tecnica del Violoncello (Milano: Ricordi and Company, 1947). In addition to extensive exercise in all of the technical types as outlined in Popper's Opus 76, Pais' cultivation of octave skills on...



Example 12. Etude No. 13

In these shifting studies, the thumb position should provide the physical focal point in forming the chord in the same way the larger-numbered finger did in lower-position chords. To reinforce this control, the excerpt may be practiced as a one-finger scale keeping the octave hand-shape by continued contact of string and third finger during the shifts.



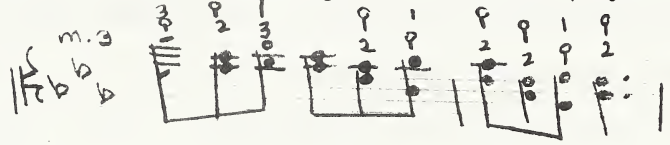
Practice of this kind should of course only follow the successful miming of various whole-and half-steps in the scale pattern away from the instrument.

The device of arpeggiation can be applied to the excerpt to combine both linear and chordal dimensions:

In this particular excerpt, the aural device of hearing the combined tones will consist of a reinforcement of the fundamental tone (see Figure 7). In this way, the phenomenon of beating when the interval is not exact will be especially pronounced. The excerpt may be played thus:

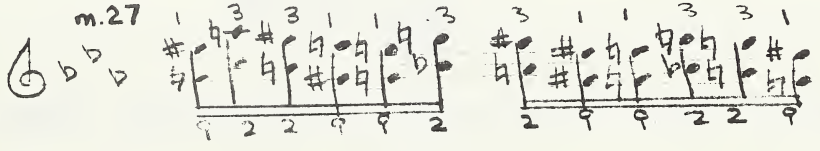
...pp. 116-125 are especially useful for the student.

In the next measure of the excerpt, it is important to alter the physical and aural point of control depending on the interval played:

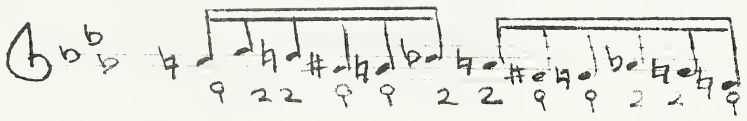


Example 13.

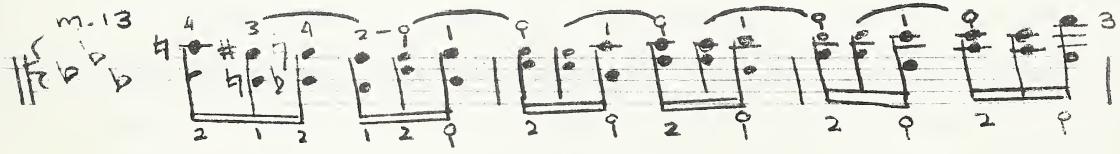
In the first two chords, control is with the thumb, then the first finger, then back to the thumb. And when the cellist plays each chord in whole notes, he has the choice of listening for either "beats" or "Tartini tones." This will depend upon the range of pitch (Tartini tones are not audible on the cello in intervals below middle C) and upon the interval itself. The octave may produce significant beating; the minor third produces a more audible Tartini tone (the beating is too rapid to be distinguishable); the major third is best checked for beating (this might depend upon the actual instrument used); the minor sixth should produce a noticeable Tartini tone (the beating is too rapid); the major sixth should produce audible beats (the low range obscures the Tartini tone). By using these physical and aural devices, the player can in time cope with the problematical intonation of the entire étude.

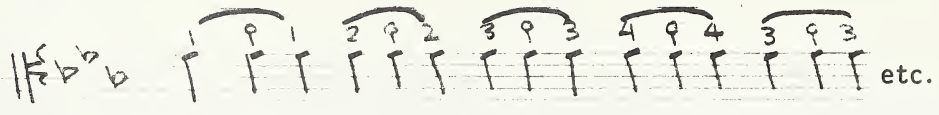
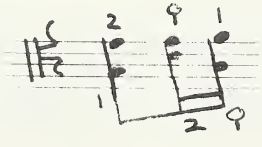
In sequential passages, the physical control for an excerpt like this:

Example 14.

can be practiced thus:



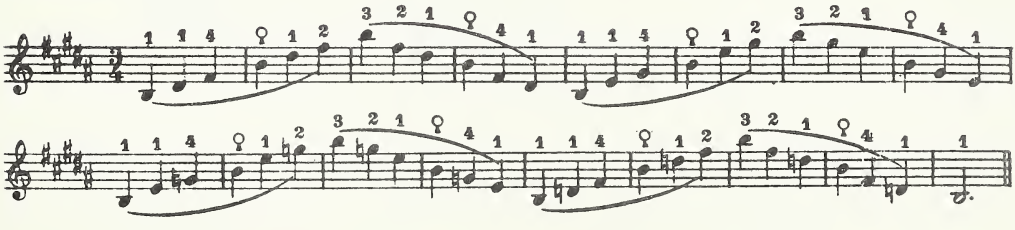
(f) Types IV and V: Double Stops and Thumb Position

In étude number nine, the cellist is confronted with a chordal study employing alternating lowered-numbered fingers and chords with the thumb and other fingers. Consequently, the problem arises of shifting from a finger to the thumb and vice versa. This requirement is neatly "spelled out" in the following measures:

Example 15.

To practice this shift, the device of thrust-release is used in the finger replacement study (see page 89) adding now the thumb as a fifth finger:

Each new finger must be balanced in order to transmit the weight of the rest of the arm. Giving one pulse per tone provides a unit of measure to gauge the physical gesture through time. The first such shift in the excerpt calls for two pulses prior to the shift into thumb position:

In other words: pulse-pulse-pulse or thrust-release on three successive sixteenth beats.

pulse-pulse-pulse

As the cellist shoots the thumb and second finger forward on the third pulse, he must have a clear aural image of the minor third before its actual intonation. He can thus "spontaneously" adjust the fingered interval to match the aural image. Without the aural image, the adjustment is not spontaneous, requiring cortical control and loss of time. Through the miming of this thrust gesture away from the cello, the cellist can "rehearse" the hand shape with the approximate spread of the thumb and second finger. He can anticipate the wider finger placement appropriate to a minor third in contradistinction to the smaller placement for the major third. The entire excerpt can be practiced in this way.

Mr. Eisenberg recommends the exercise of larger shifting for thumb/finger replacements in the practice of two-octave arpeggios on one string:[183]

Example 16

These annotations of selected Popper études have been constructed with one primary aim in mind: the creation of a musical performance which

---

[183]Eisenberg, Cello Playing, p. 72.

is both natural and communicative. The annotations are organized according to definite pedagogical principles which can guide the cello student in his cultivation of the afore-mentioned aim. As this essay attempts to demonstrate, only when the player's physical technique conforms to a kinesthetics which is natural to the body can it become subordinated to the higher order of a "psychological technique." Such a technique can be termed "ideokinetic." The playing "devices" employed in the annotations are intended to help cultivate an attitude which will ultimately result in the player's subcortical physical control. This will free the mind so that the cellist is

> able to transmit and control the musical and artistic impulses to such an extent that all mechanical problems disappear and there is nothing left for him to do but give full vent to his imagination.[184]

His playing will then begin to be instilled with a sense of purpose which is neither the bi-product of accident nor the result of physical inefficiency.

---

[184]Havas, Violin Playing, p. 2.

GLOSSARY

Afferent: sense organs; nervous stimuli to the central nervous system.

Cerebellum: that part of the brain involved in synergic control of skeletal muscles and playing an important role in the co-ordination of voluntary muscular movements. It receives afferent impulses and discharges efferent impulses...it may reinforce some reflexes and inhibit others.

Conditioned reflex or response: if a stimulus A be repeatedly presented shortly before or while an animal is making a reflexive or other established response to stimulus B, the response may later be evoked by A in the absence of B. A is the conditioned, B the unconditioned stimulus.

Efferent: nervous stimuli from the central nervous system.

Exteroceptive impulses: Afferent nerve impulses that derive their stimulation from external sources.

Ideokinetic: a process in which a mental concept or "musical image" programs a resultant physical motion. In this system, there is physical movement but no computation nor awareness of transmitted effort.

Introspection: the contemplation or reflection upon an experience either while in course or in memory; a form of observation in which an individual directs his attention to the content of his own consciousness; in practice, observation of acts or of aspects of acts or of objects of awareness not directly accessible to the observation of others.

Kinesthetic: Sense which yields knowledge of the movements of the body or its several members. The chief divisions are: (a) muscle sense with sensors embedded in the muscles and stimulated by their contraction; (b) tendon sense with sensors in the tendons; (3) joint sense with its organs on the surfaces of the joints and stimulated by their flexing; (d) labyrinthine sense with its sense organ in the inner ear adjacent to that of hearing giving the orientation of the head with respect to gravity, or its movements in space.

Palpatation: combination of touch and pressure.

Physiology: branch of biology dealing with the processes, activities, and phenomena incidental to and characteristic of life or of living organisms; the study of the functions and activities of living matter (as of organs, tissues or cells) as such and of the physical and chemical phenomena envolved.

Proprioceptive impulses: Afferent nerve impulses originating in receptors in the muscles, tendons, joints and vestibular apparatus of the internal ear. Their reflex functions are concerned with locomotion and maintenance of posture.

Reflex: a very simple act in which there is no element of choice, will or premeditation, no variable save in intensity or time.

Rote: mechanical routine; repetition of words as a means of learning them with slight attention to the sense.

Somatic nerves: the nerves serving the sense receptors and skeletal muscles in contrast with visceral nerves which serve the internal organs.

Somesthesia: the sense yielding direct impressions of bodily condition. It is mediated by data from skin, muscles and joints (Kinesthesis), and from "receptors" within the body. Once called the "common sense," it contrasts with the specific senses of sight, hearing, taste, and smell.

Tonus: degree of flexion or relaxation of muscles.

APPENDIX

The Viol, Lyra, and Rebec Families and Their Influence on the Cello

(a) Viol

Nine-membered family named viola da gamba ("leg-viol"). The name "viol" in its Italian form viola (pl. viole) has been confusingly applied to describe members of other families distinct from the viola da gamba family, e.g. viola da braccio violins, i.e. violin, viola, and cello; viola da bardone or "baryton" is a unique leg-style instrument with gut bowed strings and metal sympathetic strings. Haydn wrote 175 compositions for it; the viola d'amore ("love-viol") also has sympathetic strings and is also a hybrid invention separate from any family; the lyra bastarda ("lyra-viol") is a viola da gamba played "lyra fashion," i.e. unfretted and chordally.

The bass viola da gamba is the primary member of the family; higher and lower instruments were built later. The lowest member, the violone or contrabass-viol later evolved into the modern double bass.

Tuning: fourth-fourth-third-fourth-fourth

		Body Length	Strings
Members:	1) high treble	31.5-33.5 cm	GCead'
	2) treble		DGcead
	3) alto		CF B♭dgc
	4) small tenor }		G'CFAdg
	5) tenor }		
	6) lyra-viol	56-60 cm }	small bass gamba
	7) division viol	62-65 cm }	D'G'CEAd
	8) full consort bass		
	9) violone (contrabass)	100 cm	

Instruments were constructed in homogeneous sets of three ranges, soprano, alto-tenor, and bass. Renaissance practice was to use a "whole

consort" of instruments in an ensemble, while Baroque practice encouraged "broken consorts" with different types of instruments from different families. In the viol family the uniformity of playing technique permitted the mastering of all its members by one person, the color and range of each of which was limited according to its size.

Comparative Summary of Details of the Viol and Violin Families

Viols	Violins
Structural Typology	
1. Outline of body oval in shape, with rising shoulders blended into the neck bracket; curves of the upper and lower bouts in joining those of the middle bouts have no extending corners. The middle bouts cut into the body moderately.	1. Outline of body of the figure-eight type; shoulders in one continuous curve to which the neck bracket is tangent; curves of the upper and lower bouts in joining those of the middle bouts form extending corners. The middle bouts cut deep into the body.
2. Convex belly with plain edges fitted flush with ribs.	2. Convex belly with slightly raised edges overlapping the ribs.
3. Flat back with slanting upper part; wide cross-strip glued to inside of back upon which the sound-post rests; larger sizes have additional cross-bars reinforcing back.	3. Convex back with no extra reinforcements.
4. Deep-ribbed body in all members of the family, from the highest pitched one to the lowest. Bodies of very thin construction.	4. Shallow-ribbed bodies in violins and violas; deep-ribbed body in violoncellos and double basses built on the violin pattern.
5. The ribs at the junction of upper and lower bouts with middle bouts are fastened inside by fillets of small radius.	5. The ribs at the junction of the upper and lower bouts are fastened inside to the corner blocks.
6. The neck is broad and thin, with the back slightly	6. The neck is narrow and thick, with half-round back.

rounded; it is about 25% longer than that of the violin family.	
7. Peg-box usually ends with carved head of individual pattern representing humans or animals, sometimes ends in a scroll.	7. Peg-box ends in a scroll.
8. Tail-piece is attached to a hook-bar fixed to the bottom; no saddle.	8. Tail-piece is attached by a gut loop to the endpin; belly is reinforced by ebony saddle to prevent the loop from cutting into the soft wood of the belly.
9. The sound-holes are C-shaped of fancy shapes. Sometimes a rosette is added.	9. The sound-holes are f-shaped.
10. The strings are six in number. Later, smaller instruments had five strings and the bass viol seven strings.	10. The strings are four in number.
11. The strings are light and under moderate tension.	11. The strings are heavier as compared with those of the viols and are under considerable tension.
Tuning and Playing Technique	
12. Tuned in fourths with a major third in the middle.	12. Tuned in fifths.
13. All members of the family are held in a vertical position, on or between the legs (hence the name of the family: viola da gamba, "leg viol").	13. A violin is held in a horizontal position with the lower end resting on the left shoulder under the chin; the violoncello is held in a verticle position between the knees, supported by a steel spike resting on the floor.
14. Finger-board is fretted; this affects the quality of tone; it has almost the same sound as that of open strings: the tone is noble, yet somewhat subdued.	14. Finger-board is without frets; open strings are not used, since their tones differ considerably from stopped tones; tone color is assertive and brilliant.
15. Left-hand thumb serves as a pivot for the hand and merely touches the back of the neck.	15. Left-hand thumb envelopes the neck, guiding the hand in position shifts.

Bows and Bowing

16. Bows are straight, shorter and lighter than violin bows.	16. Bows have pronounced negative camber when hair tension is released.
17. Bow is held above the palm of the hand, two or three inches away from the nut.	17. Bow is held below the palm of the hand, close to the nut.
18. The order of the bow strokes is the reverse of that for the violin family; they are attacked on the up-bow.	18. The strings are attacked on the down-bow.[185]

(b) Lyra

The lyra was a late Renaissance and early Baroque instrument functioning as a sustained accompaniment to vocal music. While not built in matched sets but rather as custom-made instruments, there were seven members of the family in existence at one time. They were usually unfretted with drone strings (the two exterior drone strings explain the name from the harp-shaped Greek and Roman lyre); they had a flat bridge. Most were too large to be held on the arm. The tunings were consecutive for melodic use and zig-zag patterns for chordal use. Playing position was gamba style to facilitate the fingers lying across the strings.

Members: 1) treble-alto, the only one small enough to be held in arms;
2-3-4) tenor, held a spalla ("guitar") fashion;
5-6-7) bass, held gamba fashion.

Influence on the cello: the similarity with the violin family in the body acoustic; the cello and lyra both realized harmony from a figured bass, both accompanied vocal representatives. Differences are that the cello began as an instrument primarily designed to play bass

---

[185]Quoted from Nicholas Bessaraboff, Ancient European Musical Instruments (New York: October House, Inc. for the Museum of Fine Arts, Boston, 1941), pp. 292-294.

parts in consort music while the lyra da gamba was quite unsuited for this purpose.

(c) Rebec

The rebec was built in consorts. It had a pear or cucumber-shaped body with a sickle-shaped pegbox. Imported from the East, by the fifteenth century, it was a village musician's instrument used to play dance music. It is still used today in the Balkan countries and in Poland. Its three strings are tuned in fifths. It has an arched and movable bridge and is usually fretted. Its harsh tone was considered best suited in wind ensembles. The playing position is under the chin or against the chest.

Influence on the cello: its playing technique is the direct ancestor of the violin family. The tuning and arched bridge permitted melody-playing on each string. The scroll and horizontal pegs permitted greater tension of the strings. A short bow was used for crisp articulation of dance rhythms. Like the cello, its use was also to accompany singing.

Cello Sizes Available in the

Seventeenth and Eighteenth Centuries

(For purposes of comparison, one should keep in mind that the modern cello body--excluding the neck--is generally thirty inches long.)

1) Violoncello grosso - 32.4-34.4"

2) Violoncello grande - 30.4-32" 3 tunings: ♭B F c g; C G dg; C G d a

3) Violoncello normale - 28.8-30.4"

4) Violoncellino - "3/4 size" 26.8-28"

5) Violoncello piccolo - "1/2 size" 21.6-28" (This is the Lyra da gamba size, adapted from the Lyra [played "lyra fashion"] and the smallest model of bass viol used for solo playing with various tunings.)

Strung with four strings, this is the Tenore violoncello with two tunings.

Strung with five strings, this is the Violoncello piccolo of J. S. Bach and the Violoncello alto of Boccherini.

6) Guitar-violoncello - "arpegione" invented in 1824 by Johan Stauffer; cross between viola da gamba and guitar with fretted finger board and guitar tuning.

7) *[186]

Antonio Stradivari (1644-1737) made cellos in decreasing sizes that are known to exist today:

1) from 1684 bodies of 31.7-32" Bassi da chiesa

2) up until 1701 bodies of 30.6-31" "Large cellos"

3) 1710-1737 bodies of 30" "Small cellos"

It was after nine years of speculation that the "small" cello emerged unique in establishing the proportions of the whole cello (Maggini

---

[186]The Baryton Viola di bordone for which Joseph Haydn wrote 175 compositions under the patronage of an excellent performed, Prince Nikolaus Esterhazy, is not included in this list, because it is actually a bass viola da gamba with affinities to the viola d'amore in sympathetic strings.

(1580-1630) also made thirty-inch cellos). The new smaller size gives evidence of the evolution of cello-playing by this time and is a result of the demand for solo playing and competition on the cello more equal with the viola da gamba.

BIBLIOGRAPHY

Literature

Adeney, M. "Cello Teaching as a Process of Initiation." Strad, 80 (1969), 321-327.

Alexander, F. M. The Resurrection of the Body. New York: Dell Publishing Co., Inc., 1971.

_____. The Use of the Self. New York: E. P. Dutton & Company, 1932.

Bachmann, Werner. The Origins of Bowing. Translated by Norma Deane. New York: Oxford University Press, 1969.

Bacon Analee C. "The Evolution of the Violoncello as a Solo Instrument." Ph.D. dissertation, University of Syracuse, 1962.

Bazelaire, Paul. Scientific Instruction in the Violoncello. Translated by H. de Constant. Paris: Durand; Philadelphia: Elkan-Vogel, 1960.

_____. La Technique du Violoncello. Paris: A. Leduc, 1936-44.

Bessaraboff, Nicholas. Ancient European Musical Instruments; an organological study of the musical instruments in the Leslie Lindsey Mansen Collection at The Museum of Fine Arts, Boston. New York: October House (1964, c. 1941).

Bonpensiere, Luigi. New Pathways to Piano Technique. A Study of the Relations Between Mind and Body with Special References to Piano Playing. Foreword by Aldous Huxley. New York: Philosophical Library, 1953.

Boyden, David. The History of the Violin Playing from its Origins to 1761 and its Relationship to the Violin and Violin Music. London: Oxford University Press, 1965.

Chapman, Elizabeth. "The 'New Approach' in the Violin Class." American String Teachers Association, 2nd edition. (1970), 3-4, 6, 11.

Eisenberg, Maurice. Cello Playing Today. With a Foreword by Pablo Casals. London: Lavender Publications, 1957.

Gallwey, Timothy, W. The Inner Game of Tennis. New York: Random House, 1974.

Gesell, Arnold and Henry Halverson. "The development of thumb opposition in the human hand." The Pedagogical Seminary and Journal of Genetic Psychology, 48 (1936), 338-361.

Goody, William. "Sensation and Volition." Brain, LXXII (1949), 312-339.

Hajdecki, A. Die italienische Lira da Braccio. Eine kunsthistorische Studie zur Geschichte der Violine. Mostar: Im Selbstverlag des Autors, 1892.

Havas, Kato. A New Approach to Violin Playing. London: Bosworth & Company, Ltd., 1970.

_____. Stage Fright. London: Bosworth & Company, Ltd., 1974.

Hellebrandt, F. A. and Joan C. Waterland. "Indirect Learning--The Influence of Unimanual Exercise on Related Muscle Groups of the Same and the Opposite Side." American Journal of Physical Medicine, 41 (1962), 45-55.

Hellebrandt, F. A. "Living Anatomy," Quest, I (1963), 43-58. This article is also printed in William S. Middletor, Festschrift, Wisconsin Medical Journal, LXIII (1964), 525-535.

_____. "The New Approach to Violin Playing," Strad, 80 (1969), 277-281, 361-365.

_____. "The Role of the Thumb in the New Approach," Strad, 80 (1970), 421-431.

Helmholtz, Herman L. F. On the Sensations of Tone as a Physiological Basis for the Theory of Music. 2nd. English ed. London: Reprinted Ed., New York: Dover Publications, 1954.

Hindemith, Paul. A Composer's World. Cambridge, Mass: Harvard University Press, 1969.

Hodgson, Percival. Motion Study and Violin Bowing. Urbana: American String Teachers' Association, 1958.

Kenneson, Claude. A Cellist's Guide to the New Approach. New York: Exposition Press, 1974.

Kinney, Gordon, J. "The Musical Literature for Unaccompanied Violoncello." Ph. D. dissertation in Music Theory, Florida State University, 1962.

La Rue, Jan. Guidelines for Style Analysis. New York: W. W. Norton & Company, Inc., 1970.

Leland, Valborg. The Dounis Principles of Violin Playing. London: The Strad, 1949.

Martens, Fredrick, H. String Mastery. New York: Frederick A. Stokes Company, 1923.

Mainwaring, James D. "'Gestalt' Psychology," Grove's Dictionary of Music and Musicians. Edited by Eric Blom. 10 vols. 5th ed. London: MacMillan Company, 1954-61, III, 611-618.

Netter, Frank H. Nervous System. Vol I of The Ciba Collection of Medical Illustrations. 5 vols. Montreal: Ciba Company, Ltd., 1953.

Oenfield, Wilder, and Edwin Boldrey. "Somatic Motor and Sensory Representation in the Cerebral Cortex of Man as Studied by Electrical Stimulation." Brain, 60 (1937), 389-443.

Ostrander, Sheila and Lynn Schroeder. Psychic Discoveries Behind the Iron Curtain. New York: Bantam Books, 1973.

Pais, Alfredo. La Technica del Violoncello. Milano: Ricordi & Company, 1947.

Potter, Louise. The Art of Cello Playing. Illinois: Summy-Birchard, 1964.

Roland, Paul. Development and Trial of a Two Year Program of String Instruction. U.S. Department of Health, Education and Welfare, 1971.

Rolf, Ida, P. "Structural Integration." Systematics, I (1963), 67-83.

Russell, Ritchie, W. Brain, Memory, Learning. London: Oxford University Press, 1959.

Sorell, Walter. The Story of the Human Hand. New York: Bobbs-Merrill & Company, Inc., 1967.

Stanfield, M. B. "Reflexes." Strad, 78 (1967), 139-143.

_____. "Technique Building for Cellists. No. 5." Strad, 79 (1969), 473-477.

_____. "Technique Building for Cellists. No. 8." Strad, 80 (1969), 69-71.

Strunk, V. Oliver. Source Readings in Music History. New York: W. W. Norton & Company, Inc., 1965.

Szende, Otto and Milhaly Nemessuri. The Physiology of Violin Playing. London: Collett's Ltd., 1971.

Szomoru, Arpad. Cello-Pedagogy; on becoming you. Florida: Performing Arts Institute, 1972.

Thompson, William, A. R., ed. Black's Medical Dictionary. 29th ed. London: Adam & Charles Black, 1971.

Ulrich, Homer. Chamber Music. New York: Columbia University Press, 1966.

Zuckerkandl, Victor. Sound and Symbol, Music and the External World. Princeton: Princeton University Press, 1969.

Music

Dotzauer, Friedrich. 113 Studies for Cello Solo. ed. by Klingenberg. New York City: International Music Company, n.d.

Popper, David. Four Studies. For violincello with added piano accompaniment by Deszo Kordy. London: Novello & Company, Ltd., n.d.

_____. Highschool of Cello Playing. New York City: International Music Company, n.d.

Date Due

JAN 10 '78

APR 25 '78

SEP 2 1980

FORM 109